



King County  
Lower Duwamish Waterway Source Control  
Implementation Plan

2014–2018

Prepared for the Washington State Department of Ecology  
June 2014

**DRAFT**

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## Acronyms and Abbreviations

µg	micrograms
BEHP	bis (2-ethylhexyl) phthalate
BHC	bmp hexachloride
BMP	best management practice
CAD	computer-aided design
Cadman	Cadman Aggregate and Ready-Mix
CAP	cleanup action plan
CDL	construction demolition and land clearing debris
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminants of concern
COPC	contaminant of potential concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CSGP	Construction Stormwater General Permit
CSL	cleanup screening level
CSO	combined sewer overflow
DDT	dichlorodiphenyltrichloroethane
DMMP ML	Dredge Material Management Program maximum level
DMMP SL	Dredge Material Management Program screening level
DNRP	King County Department of Natural Resources and Parks
DOH	Washington State Department of Health
DOT	King County Department of Transportation
DPER	Department of Permitting and Environmental Review
DSN	Discharge Serial Number
dw	dry weight
Ecology	Washington State Department of Ecology
ECOSS	Environmental Coalition of South Seattle
EPA	U.S. Environmental Protection Agency
ERTS	Emergency Referral and Tracking System
ESA	Environmental Site Assessments
FAA	Federal Aviation Administration
FMD	King County Facilities Management Division
FS	Feasibility Study
FOD	Foreign Object Debris
FTE	full-time employee
GIS	Geographic Information System
GSI	Green Stormwater Infrastructure
HPAH	high molecular weight PAH
HQ	hazard quotient

IC/IDDE	Illicit Connections and Illicit Discharges Detection and Elimination
ISGP	Industrial Stormwater General Permit
KCC	King County Code
KCIA	King County International Airport
KCIW	King County Industrial Waste Program
Kg	kilograms
L&I	Washington State Department of Labor and Industries
LDW	Lower Duwamish Waterway
LDWG	Lower Duwamish Waterway Group
LHWMP	King County Local Hazardous Waste Management Program
LID	low impact development
LOAEL	lowest-observed-adverse-effect level
LPAH	low molecular weight PAH
Manson	Manson Construction Company
Metro	Municipality of Metropolitan Seattle
MG	million gallons
mg	Milligrams
mg/kg oc	milligrams per kilogram organic carbon
mgd (or MGD)	million gallons per day
MIC	Manufacturing/Industrial Center
ML	maximum level
MLK	Martin Luther King
MNR	monitored natural recovery
MS4	Municipal Separate Storm Sewer System
MSGP	Municipal Stormwater General Permit
MT/Y	metric tons per year
MTCA	Model Toxics Control Act
n/a	not applicable
NBF	North Boeing Field
NEP	National Estuary Program
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no-observed-adverse-effect level
NPDES	National Pollutant Discharge Elimination System
NWRO	Northwest Regional Office
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PERC	perchloroethylene
PLP	potential liable parties
ppb	parts per billion
ppm	parts per million
PSAMP	Puget Sound Ambient Monitoring Program
PSCAA	Puget Sound Clean Air Agency

RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Conditions
RI	remedial investigation
RI/FS	Remedial Investigation/Feasibility Study
RM	River Mile
RME	reasonable maximum exposure
ROW	right-of-way
RSD	King County Roads Services Division
SAP	Sampling and Analysis Plans
SCCG	source control coordination group
SCWG	Source Control Workgroup
SD	storm drain
SEPA	State Environmental Policy Act
SMC	Seattle Municipal Code
SMP	Sediment Management Plan
SMS	Sediment Management Standards (Washington State)
South Plant	South Treatment Plant
SPS	south pump station
SPU	Seattle Public Utilities
SQS/LAET	sediment quality standards/low apparent effects threshold
STORM	Stormwater Outreach for Regional Municipalities
SVOC	semi-volatile organic compound
SWD	King County Solid Waste Division
SWMP	Stormwater Management Program
SWPPP	Stormwater Pollution Prevention Plan
SWS	Stormwater Services Section
TBT	tributyltin
TEQ	toxic equivalent
TMDL	Total Maximum Daily Load
TRV	toxicity reference value
UST	Underground Storage Tanks
WAC	Washington Administrative Code
West Point	West Point Treatment Plant
WLRD	King County Water & Land Resources Division
WRF	water recreation facility
WRIA	Water Resources Inventory Area
WTD	King County Wastewater Treatment Division
YSC	Youth Services Center



## **Executive Summary**

King County's Source Control Implementation Plan builds on the significant clean water investments the County has made in the Lower Duwamish Waterway (LDW) for over 50 years. The plan includes a continued commitment to regulating and monitoring industrial dischargers to the King County sanitary system in the LDW; implementing planned combined sewer overflow (CSO) control projects; managing the implementation of the County's Phase I Municipal Stormwater permit; providing technical and educational programs for businesses and residents on ways to prevent pollutants from entering the LDW; conducting scientific assessments, sampling and source tracing, and system mapping; and committing to full compliance with water and air quality permits and regulations at County-owned and operated facilities.

### **Source Control Planning in the Lower Duwamish Waterway**

The Washington State Department of Ecology (Ecology) issued a draft update to its LDW Source Control Strategy in December 2012. The strategy is a component of the U.S. Environmental Protection Agency's (EPA) Proposed Plan for the LDW Superfund Site<sup>1</sup>. Two key goals of Ecology's updated strategy are to sufficiently control sources so that sediment cleanup can begin and to minimize recontamination of sediments after the LDW Superfund cleanup has occurred.

Ecology asked King County, the City of Seattle, and EPA to provide agency-specific implementation plans that describe how each agency will conduct LDW source control work through 2018 in the target area (Figure ES-1). The implementation plans will be included as an appendix to Ecology's updated strategy.

The County's five-year (2014–2018) LDW Source Control Implementation Plan consists of (1) ongoing source control actions and programs; (2) additional and accelerated source control actions; and (3) a commitment to continue to coordinate source control efforts in the County and with external partners.

### **Historical Water Quality Investments in the Lower Duwamish Waterway**

King County has been working to keep pollutants from entering the LDW since the 1960s. The formation of the Municipality of Metropolitan Seattle (Metro) in 1958 led to the elimination of untreated sewage and primary-treated effluent discharges into the LDW through the development of the regional wastewater treatment system.

With the opening of the West Point Treatment Plant (West Point) in 1966, untreated sewage and primary-treated effluent that once flowed daily into the LDW was conveyed to the West Point plant for treatment and discharge into Puget Sound. Since the opening of the South Treatment Plant (South Plant) in 1965, untreated sewage and primary-treated effluent that flowed into the Green/Duwamish River upstream of the LDW is being treated and discharged as secondary treated effluent. In 1986, a new effluent discharge pipeline and deep-water outfall in Puget Sound were completed to eliminate the secondary treated effluent discharges from South Plant to the Green/Duwamish River.

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<sup>1</sup> Ecology's strategy was included as Appendix A to EPA's Proposed Plan for the LDW Superfund Site, February 2013, and is available at <http://yosemite.epa.gov/r10/cleanup.nsf/sites/lduwamish>. Superfund refers to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).



**Figure ES-1. Lower Duwamish Waterway Source Control Area**

King County also established one of the first programs in the nation to regulate industries to remove toxicants before discharging their wastewater into the sewer system. By the 1970s, the County was partnering with the City of Seattle, the Port of Seattle, other cities, local sewer utilities, and government agencies to support programs preventing new and ongoing sources of pollution from degrading our regional water bodies. These source control efforts have reduced flows of industrial waste and sewage to the Green/Duwamish River by 98 percent, or 27 billion gallons per year.

In 1994, King County assumed Metro's authority and its legal obligation for water pollution abatement. Since that time, the County has continued to implement projects and practices to protect water quality in the LDW and across the County.

In 2013, King County entered into a consent decree with the U.S. Department of Justice, EPA and Ecology that ensures its CSO control plan is completed by 2030. King County had already committed to limiting CSOs to one per year at each outfall by 2030 through its adopted policies and a 2011 agreement with Ecology.

The four CSO projects that the County is committed to implementing in the LDW are (1) Chelan Avenue storage tank and pipeline improvements; (2) West Michigan-Terminal 115 storage, pipeline improvements and green stormwater infrastructure (GSI); (3) Georgetown (Brandon-Michigan) wet weather treatment station; and (4) Rainier Valley Wet Weather Storage (Hanford #1) for storage and conveyance improvements.

### **Ongoing Actions and Programs**

King County's ongoing actions have had and will continue to have a positive impact on sediment and water quality in the LDW. Since the 1960s, the County has made significant investments to clean up sediment in the LDW and help improve water quality. The proposed additional and accelerated actions will increase current investments by over \$3.5 million (2014 dollars) over the next five years in a push to further protect and restore the LDW prior to implementation of sediment cleanup actions through the County's Lower Duwamish Source Control Implementation Plan.

The County's previous investments in CSO control have significantly reduced CSO volumes and pollutant loads into our waterways. The cornerstone of King County's Lower Duwamish Source Control Implementation Plan are four CSO control projects that will cost approximately \$225 million (2010 dollars) to implement. The four planned projects will control the remaining uncontrolled CSOs in the LDW, removing most of the untreated combined stormwater and wastewater flows into the LDW. Planning or design for these projects is under way. They will be in operation by 2030.

In addition to the four CSO control projects, the County's other ongoing LDW source control actions and programs form the backbone of the County's source control efforts. Several county divisions and the multi-jurisdictional groups, such as the Local Hazardous Waste Management Program (LHWMP), carry out ongoing LDW source control activities in accordance with regulatory requirements and county commitments. For example, the County has been monitoring and regulating industrial dischargers to the LDW since 1969. The King County Industrial Waste Program (KCIW) will continue to control sources of contamination in the LDW far into the future.

Other examples of the County's ongoing pollution control actions in the LDW are as follows:

- Providing technical and educational programs for businesses and residents on ways to prevent pollutants from entering the LDW
- Complying with all permits including wastewater, industrial, and municipal stormwater NPDES permits to reduce pollutants being released to the LDW
- Carrying out stormwater management and spill prevention programs to reduce pollutants entering storm drains and combined systems
- Conducting water quality studies related to the Green/Duwamish River to better understand where and how pollutants are entering upstream of the LDW
- Cleaning up contaminated sediments in the LDW to reduce pollutants in the LDW
- Performing source identification, tracing, and sampling in the LDW to reduce pollutants being released to the LDW
- Installing equipment and monitoring flows to optimize the collection system and reduce overflows
- Performing facility and line inspections, maintenance, and cleaning to keep the collection system functioning properly and reduce releases to the LDW

### **Additional and Accelerated Lower Duwamish Waterway Source Control Actions in 2014–2018**

The purpose of the proposed additional and accelerated actions is to expand and increase the benefits of the County's ongoing and planned source control work to keep pollutants from entering the LDW. In accordance with Ecology's direction in its updated LDW source control strategy, the actions are above and beyond the County's existing LDW source control actions and commitments or are actions that will be completed sooner than required. All necessary authorization and funding will be sought from the King County Council to implement proposed additional activities.

The following are source control actions that compliment and expand existing programs and commitments.

#### **Wastewater Treatment Division in the Department of Natural Resources and Parks**

King County, the City of Seattle, and several other jurisdictions share responsibility for managing sources of pollution in the LDW. Seattle has the jurisdictional authority in most of the LDW that is required to prevent contamination of stormwater. However, the County's CSO Control Program removes on average more than 85 percent of the stormwater that drains to the combined sewer system and treats it at the West Point plant, thus significantly reducing the pollutants that otherwise would enter the LDW.

Additional action beyond ongoing activities is needed to further reduce pollutants entering the LDW. King County's Wastewater Treatment Division (WTD) and the City of Seattle are working on developing an agreement for coordinating and optimizing the combined system to



further improve pollutant capture. WTD will conduct additional activities to improve source control in the LDW. Highlights of these WTD actions are as follows:

- **Expanded sampling.** WTD will develop an annual sampling plan by December 31 of each year. The plan will include the use of sediment traps and the collection of in-line solids grab samples in the areas of focus. Sampling will be tailored and re-evaluated to align with CSO control.
- **Stormwater assessment.** WTD is committing to funding an Ecology inspector position through 2015 to complete an expanded assessment of stormwater in the County's Brandon CSO basin and in selected subareas in its South Michigan CSO basin. After evaluation of the gathered data, WTD will develop a plan for additional source control actions as needed.
- **LDW Green Grants Program.** WTD's rate and budget proposal for 2015–2016 includes funding for "Our Waters" program that will extend and replace the Green Grants Program beyond the planned sunset date in 2015. The program began in 2011 and provides funding for air or water quality improvement projects, environmental education, and community outreach efforts in the Duwamish River Valley. The green grants target a community that has disproportionate human health outcomes and environmental burdens and improves equity and social justice by supporting the community's vision for vibrant, healthy neighborhoods around the Duwamish River.

#### **Water and Land Resources Division in the Department of Natural Resources and Parks**

The Water and Land Resources Division (WLRD) intends to complete its mapping of the County's Municipal Separate Storm Sewer System (MS4) in the LDW sooner than required by the County's stormwater National Pollutant Discharge Elimination System (NPDES) permit. WLRD also plans to increase the frequency of source control inspections in the South 96th Street Corridor, which is home to a number of industrial activities in the LDW drainage basin.

Highlights associated with these actions are as follows:

- **Accelerated mapping.** The County's 2013 municipal NPDES Phase 1 stormwater permit requires that the County's MS4 and connections to the MS4 in the urban and higher rural sub-basins in unincorporated King County be mapped by December 31, 2017. WLRD is prioritizing the LDW drainage basin and plans to complete this area's mapping by June 30, 2015. This effort includes the migration of data for all available stormwater features that exist in varying formats of stormwater mapping information into the central County stormwater geodatabase for the LDW.
- **Source control inspections in the South 96th Street Corridor.** The majority of the potential pollutant-generating sites in unincorporated King County that are in the drainage boundary of the LDW Superfund cleanup site are located between State Route 509 and the Duwamish River, and north of South 102nd Street to the border with the City of Seattle. This area is commonly referred to as the South 96th Street Corridor. The corridor has long been home to a number of industrial activities.

The current source control inspection rate is approximately one inspection per site every five years. The County intends to increase inspections in the South 96th Street Corridor to one every two to three years, depending on the nature of the business and its potential to pollute.

### **King County International Airport in the Department of Transportation**

There are approximately 15 miles of stormwater drainage pipe in the King County International Airport (KCIA) storm drainage system. In addition to stormwater monitoring, KCIA intends to continue in-line sediment traps and grab sampling in targeted areas in its drainage system on an annual basis in 2014–2018. This effort will assist in source tracing, identification, and control activities in the airport. KCIA will conduct annual evaluations to help determine the following:

- Effectiveness of source control activities and best management practices (BMPs)
- Changes from airport/tenant industrial activities
- Trends in pollutant contributions

### **Roads Services Division in the Department of Transportation**

The King County Roads Services Division (RSD) has some responsibility for maintaining the County's MS4 system as part of the County's municipal stormwater NPDES permit. Responsibilities include street sweeping and vactoring, repairing, and cleaning of stormwater flow control and water quality treatment facilities, catch basins, and conveyance systems.

RSD intends to conduct additional maintenance, including line cleaning, during 2014–2018 to address legacy loads in the County's right-of-way (ROW) stormwater lines in unincorporated areas of the LDW drainage basin. Because legacy contaminants may adhere to the stormwater lines, cleaning the lines could prove to be effective in helping prevent pollutants from entering the LDW.

### **Internal and External Coordination**

Coordination among county divisions and with external agencies involved in LDW source control is a key component in accomplishing effective source control and implementing adaptive management strategies as needed. The County participates in a number of forums and groups that are dedicated to preventing pollutants from entering the LDW and intends to continue being an active participant in these efforts over the long-term. The County is also working with other jurisdictions to better coordinate and resolve jurisdictional authority and clarify responsibilities to improve source control.

A team of representatives from the above four county divisions and from the Facilities Management Division (FMD), Solid Waste Division (SWD), Public Health – Seattle & King County (Public Health), and LHWMP in King County has been assembled and has been meeting routinely for over a year to coordinate the development of this 5-year implementation plan. The County intends to continue its internal coordination through a team of representatives from the various divisions in the future to discuss ongoing activities and to develop the County's 20-year LDW Source Control Implementation Plan.

## 1.0 Introduction

This document summarizes King County's LDW Source Control Implementation Plan for 2014-2018. This chapter provides background on the reasons for the plan and on the County's efforts to keep pollutants out of the LDW. It ends with a description of the content and organization of the plan.

### 1.1 History

In December 2012, as part of the EPA's Proposed Plan for the LDW Superfund site, Ecology updated its LDW Source Control Strategy that was published in 2004.<sup>1</sup> In its updated strategy, Ecology asked King County, the City of Seattle, and EPA to provide agency-specific implementation plans that describe how each agency will conduct source control work.

Two key goals of Ecology's updated strategy are to sufficiently control sources so that sediment cleanup can begin and to minimize recontamination of sediments after the LDW Superfund cleanup has occurred. Although the majority of the contaminants of concern (COCs) in the sediments are from historical releases, there are still ongoing releases that need control. The COCs that pose unacceptable risk to human health include polychlorinated biphenyls (PCBs), arsenic, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), and dioxins/furans. The COCs that pose unacceptable risk to aquatic organisms include PCBs, metals, and other organic compounds, such as phthalates. A list of the COCs that are being looked at as part of the LDW Superfund cleanup and are the target for source control is provided in Appendix A.

The LDW source control area includes both King County and Seattle Public Utilities (SPU) combined sewer overflows (CSO) and separated basins that SPU; the cities of Tukwila, Burien, and Renton; and King County are responsible for (Figure 1-1). This source control plan covers the King County combined and separated stormwater basins in the area.

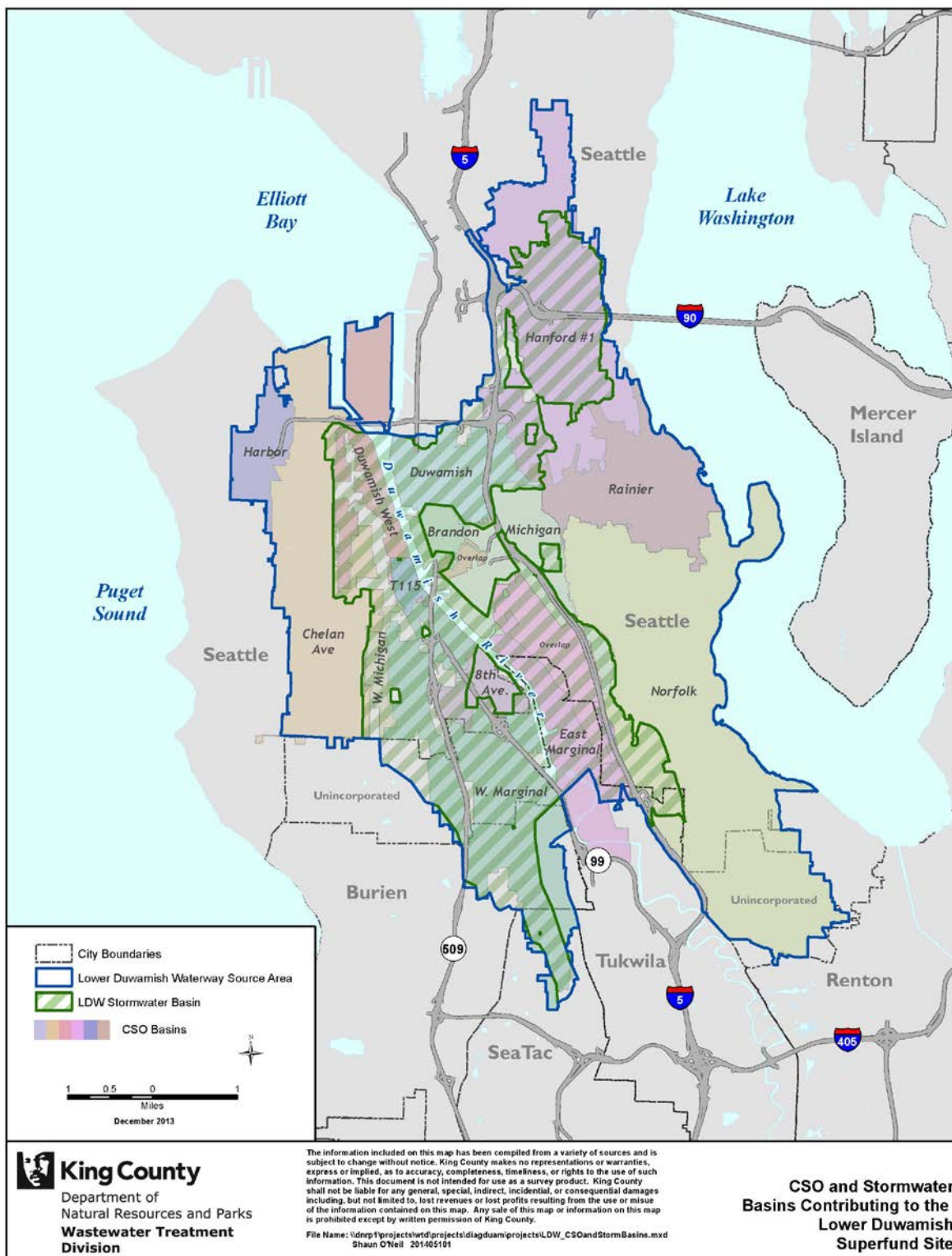
King County has been working to keep pollutants from entering the LDW since the 1960s. The formation of Metro in 1958 led to the elimination of untreated sewage and primary-treated effluent discharges into the LDW through the development of the regional wastewater treatment system. In 1994, King County assumed Metro's authority and its legal obligation for water pollution abatement.

With the opening of West Point Treatment Plant in 1966, untreated sewage that once flowed daily into the LDW was conveyed to the West Point plant for treatment and discharge into the Puget Sound. In 1968, Metro established one of the first programs in the nation to regulate industries to remove toxicants before discharging their wastewater into the sewer system. Since the opening of South Plant in 1965, untreated sewage and primary-treated effluent that flowed into the Green/Duwamish River upstream of the LDW is being treated and discharged as secondary treated effluent. In 1986, a new effluent discharge pipeline and deep-water outfall in Puget Sound were completed to eliminate the secondary treated effluent discharges from South Plant to the Green/Duwamish River. These source control efforts have reduced flows of

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<sup>1</sup> Ecology's strategy was included as Appendix A to EPA's Proposed Plan for the Lower Duwamish Waterway (LDW) Superfund Site, February 2013, and is available at <http://yosemite.epa.gov/r10/cleanup.nsf/sites/lduwamish>. Superfund refers to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

industrial wastewater and raw sewage into the LDW by 98 percent, or 27 billion gallons per year, and have significantly reduced contaminant concentrations in the remaining releases.



**Figure 1-1. Lower Duwamish Waterway Source Control Area**

Preventing industrial wastewater and raw sewage discharges from entering the LDW is just one of a number of actions Metro, and now King County, have carried out to restore the water quality of the LDW. The County has also invested in restoring more than 25 acres of habitat, numerous water quality studies, programs to improve water quality, controlling CSOs, and sediment cleanups. These investments have successfully removed decades of contamination from some of the waterway's most contaminated areas.

Highlights of some of these efforts are listed below:

- **Multiple water quality studies and data collection efforts.** Metro began conducting water quality studies in the Green/Duwamish River in 1958 and, in 1964, began the first year of continuous data collection to characterize the local water bodies and identify water quality needs.
- **Puget Sound Estuary Program Elliott Bay Action Plan.** This multi-agency program (EPA, Ecology, City of Seattle, Metro, King County, Port of Seattle, and others) and multi-year comprehensive plan was carried out in the 1980s and resulted in the identification and elimination of many industrial process discharges into the LDW.
- **Efforts to characterize and control pollution from stormwater.** The County became a leader in the movement to characterize and control pollution from stormwater. The County continues these efforts through its work to control the small remaining percentage of untreated stormwater being discharged from its CSOs, implementing stormwater management and spill prevention programs in separated basins under its jurisdiction, and conducting remediation efforts of historical upland and aquatic contamination.
- **Elliott Bay/Duwamish Restoration Program.** As a partner in this program, the County implemented some of the first sediment remediation efforts and habitat improvements in the LDW at the Norfolk and Duwamish/Diagonal CSO/Storm Drain (SD) sediment cleanup sites and the Herring's House Park, Hamm Creek, Turning Basin, and Cecil B. Moses restoration sites. The program was the result of a 1991 legal settlement reached by the City of Seattle and King County (then Metro) with the National Oceanic and Atmospheric Administration (NOAA). The U.S. Fish and Wildlife Service, Ecology, Suquamish Tribe, Muckleshoot Indian Tribe, NOAA, City of Seattle, and King County administered the program.
- **Lower Duwamish Waterway Group.** The Lower Duwamish Waterway Group (LDWG) is made up of King County, the City of Seattle, the Port of Seattle, and The Boeing Company. LDWG has been working with EPA and Ecology since 2001 to study the contamination and determine the best and most effective alternatives to clean up the waterway. The LDW Remedial Investigation/Feasibility Study (RI/FS) resulted from these efforts.<sup>2</sup> LDWG's investment of over \$135 million both on studies to date and on early action sediment cleanups is expected to reduce the average concentration of PCBs found in the sediment by 50 percent. The early action cleanups included the Norfolk and Duwamish/Diagonal projects.

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<sup>2</sup> The documents associated with the LDW RI/FS are available at: <http://yosemite.epa.gov/R10/CLEANUP.NSF/LDW/Lower+Duwamish+Waterway+Superfund+Site+Technical+Documents>.

- **Source Control Work Group.** Since 2002, King County has been a member of the LDW Source Control Workgroup (SCWG), which was formed by Ecology to bring together agencies with the regulatory authority to implement source control measures in the LDW. The purpose of the SCWG is to share information, discuss strategy, and share progress reports on LDW source control activities.

The County's ongoing work to protect and enhance water quality in the LDW also aligns with the goals and principles of the King County Strategic Plan, which is based on the values and priorities of county residents. A core element of the Strategic Plan is environmental sustainability and its goal is to safeguard and enhance the County's natural resources. A guiding principle of the strategic plan is to integrate equity and social justice into all of the County's work, including the efforts in the LDW. The County has been engaging the diverse communities that live, work, and fish in the LDW area to help guide decisions and priorities regarding actions that could affect the LDW. Community engagement has influenced proposed cleanup strategies in the LDW Superfund site, decisions on plans and projects to control county CSOs in the LDW, and development and implementation of education and outreach programs in the LDW.

## 1.2 Content and Organization of this Plan

The Washington State Department of Ecology's Lower Duwamish Waterway Source Control Strategy, Revised 2012 (Strategy), documents a coordinated and committed long-term effort for managing source control in the LDW. King County's LDW Source Control Implementation Plan is responsive to Ecology's Strategy.

Ecology's primary near-term goal for source control is to address existing sources of contaminants in the LDW. In the long term after the sediment remedy is in place, Ecology's goal is to minimize the risk of recontaminating sediments to levels above the Sediment Cleanup Standards established in the LDW Superfund Cleanup Site Record of Decision. A secondary goal is to support habitat restoration opportunities. Ecology identified seven objectives for meeting their Source Control Strategy Goals.

Table 1-1 provides a cross-reference between Ecology's Strategy and King County's LDW Source Control Implementation Plan. Each of Ecology's seven objectives are mapped to corresponding source control actions that King County will implement over the next five years. Table 1-1 demonstrates that the King County LDW Source Control Implementation Plan thoroughly and completely addresses the guiding framework established by Ecology's source control goals and objectives.

In 2010, King County participated in the development of a preliminary needs assessment with its SCWG partners to assess current efforts to control sources in the LDW, identify any existing gaps, and identify supplemental efforts needed to address those gaps in the future. The needs assessment provided the framework for developing the County's approach to addressing Ecology's Source Control Strategy objectives. The County's LDW Source Control Implementation Plan, identifies actions within the County's authority that are needed to successfully implement source control in the LDW.

King County's LDW Source Control Implementation Plan consists of the following components:

- **Current LDW source control actions and commitments (Chapter 2).** Four major CSO control projects and other ongoing County source control actions and commitments form

the backbone of the County's source control efforts. More detailed information on the history and ongoing work of the county divisions and a multi-jurisdictional program that carry out efforts to control pollutants from entering the LDW are provided in Chapter 2 and Appendix B.

- **Additional and accelerated actions that county divisions will carry out in 2014-2018 (Chapter 3).** The purpose of these actions is to expand and increase the benefits of the County's ongoing and planned source control work to control pollutants from entering the LDW. The actions have been developed in response to Ecology's updated LDW source control strategy published in December 2012. Per Ecology's direction, the actions are designed to improve sediment quality and are above and beyond the County's existing LDW source control requirements and commitments or are actions that will be completed sooner than required. These actions are described in Chapter 3.
- **Internal and external coordination (Chapter 5).** Coordination among county divisions and with external agencies involved in LDW source control is a key component in accomplishing effective source control and implementing adaptive management strategies as needed. Coordination between WTD and SPU regarding management responsibilities and implementation of source control actions is particularly important. The County's approach for coordination internally and externally is described in Appendix B.

Actions in the body of the plan are presented according to the division of County government that is responsible for implementation.





**Table 1-1. Cross-Reference of the Ecology Source Control Strategy and the King County Five-Year LDW Source Control Implementation Plan**

<b>Objective to Meet Ecology Source Control Strategy Goals</b>	<b>King County Strategy</b>	<b>Actions (Bolded action = accelerated and additional action)</b>	<b>Outputs by 2018 <sup>a</sup> (Bolded output = accelerated and additional output)</b>	<b>Ecological and Human Dimension Outcomes</b>
Identify and, to the extent possible, control ongoing sources of chemicals to LDW sediments with the potential to exceed cleanup levels	Control releases from the combined sewer system	<ul style="list-style-type: none"> <li>• Implement Protecting Our Waters – CSO Control Program</li> <li>• Comply with NPDES permit for West Point (includes LDW)</li> <li>• Regulate wastewater discharges to combined system</li> <li>• Monitor, maintain, and inspect wastewater facilities</li> <li>• Characterize relative inputs of sewer, stormwater, and groundwater</li> <li>• <b>Implement LDW Green Grants Program</b></li> <li>• <b>Determine significance of stormwater inspections in combined sewer system</b></li> <li>• <b>Conduct source identification and tracing</b></li> </ul>	<ul style="list-style-type: none"> <li>• Begin construction of Rainier Valley Wet Weather Storage project (Hanford #1) by end of 2016; submit facility plan to Ecology for Georgetown Wet Weather Treatment Station by end of 2015; reduce volumes for West Michigan and Terminal 115 by infiltration through 2015, then start design</li> <li>• Meet all West Point permit conditions that apply to the LDW</li> <li>• Review all discharge authorizations in the LDW basin; apply discharge authorizations to any new discharges</li> <li>• Enforce food and water recreation facility wastewater disposal regulations</li> <li>• Inspect all county lines on a 7-year cycle; inspect all outfall pipes on a 5-year cycle; maintain West Duwamish rock box annually; maintain facilities as needed</li> <li>• <b>Award grants for air and water improvements in the Duwamish Valley in 2014 and 2015</b></li> <li>• <b>Complete inspections in target basins and summarize findings for the SCWG by 2016</b></li> <li>• <b>Complete sampling and develop report for the CSO and Green River inputs by 2015</b></li> <li>• <b>Collect sediment traps and follow-up in line grab samples in each sub-basin once every 5 years</b></li> </ul>	<ul style="list-style-type: none"> <li>• Keep sediment concentrations below marine sediment cleanup levels</li> <li>• Reduce fish tissue concentrations</li> <li>• Meet marine water quality criteria</li> </ul>
	Control releases from the MS4 system in unincorporated King County	<ul style="list-style-type: none"> <li>• Comply with county MS4 Municipal Stormwater Permit</li> <li>• Conduct road service programs to reduce pollutant releases from county MS4 system</li> <li>• <b>Conduct increased inspections</b></li> <li>• <b>Complete mapping in the basin</b></li> <li>• <b>Clean lines when necessary <sup>b</sup></b></li> </ul>	<ul style="list-style-type: none"> <li>• Meet all county MS4 municipal stormwater permit conditions that apply to the LDW, including source control inspections, stormwater facility inspections, water quality complaints, illicit discharge detection and elimination, and spill response</li> <li>• Implement the Regional Roads Maintenance Endangered Species Act (ESA) Program, and the snow and ice response program</li> <li>• <b>Complete inspections in the South 96th Street Corridor</b></li> <li>• <b>Complete mapping of the county MS4 in the basin</b></li> <li>• <b>Initiate line-cleaning program and identify and secure additional funding for line cleaning in the basin</b></li> </ul>	
	Control releases from county-owned property	<ul style="list-style-type: none"> <li>• <b>Identify and control releases from properties</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Characterize stormwater solids at KCIA</b></li> <li>• Complete business inspections of all properties</li> <li>• Meet all conditions of the Industrial Stormwater General Permit (ISGP) for the KCIA</li> <li>• Meet all county MS4 municipal stormwater permit conditions that apply to County properties</li> <li>• Conduct the RI/FS for the North Boeing Field/Georgetown Steam Plant state Model Toxics Control Act (MTCA) order by 2016</li> <li>• Conduct site investigations and hazardous materials abatement during redevelopment</li> <li>• Comply with dangerous waste disposal and reporting and underground storage tank (UST) requirements</li> </ul>	
	Control releases from other properties	<ul style="list-style-type: none"> <li>• Regulate safe handling of solid waste</li> <li>• Implement the Moderate Risk Waste Plan</li> </ul>	<ul style="list-style-type: none"> <li>• Review operation plans and inspect solid waste facilities</li> <li>• Review and assess permit-exempt solid waste facilities</li> <li>• Respond to illegal dumping</li> <li>• Provide collection of household hazardous waste and small quantity generator waste</li> </ul>	

Objective to Meet Ecology Source Control Strategy Goals	King County Strategy	Actions (Bolded action = accelerated and additional action)	Outputs by 2018 <sup>a</sup> (Bolded output = accelerated and additional output)	Ecological and Human Dimension Outcomes
	Control releases from septic systems	<ul style="list-style-type: none"> <li>Regulate on-site septic systems</li> </ul>	<ul style="list-style-type: none"> <li>Review all permit applications for new systems and current maintenance reports on home sales</li> <li>Respond to all complaints of septic failures</li> </ul>	
	Identify sources to the Green/Duwamish River	<ul style="list-style-type: none"> <li>Conduct studies of relative inputs of contaminants to the Green/Duwamish basin</li> </ul>	<ul style="list-style-type: none"> <li>Complete air deposition, water, sediments, and suspended solids studies on the Green/Duwamish basin</li> </ul>	
Apply administrative and legal authorities to accomplish corrective actions in areas contributing to contaminated sediments	Conduct corrective actions when necessary for inappropriate discharges to the sewer or County MS4	<ul style="list-style-type: none"> <li>Follow up on all identified industrial waste problems and referrals</li> <li>Follow up on all identified stormwater problems and referrals</li> <li>Work with Puget Sound Clean Air Agency (PSCAA) on control of air emissions</li> <li><b>Conduct review of existing regulatory authorities</b></li> </ul>	<ul style="list-style-type: none"> <li>Resolve all identified Industrial Waste problems and referrals</li> <li>Resolved all identified stormwater problems and referrals</li> <li>Participate on PSCAA board and advisory council</li> <li><b>Identify schedule to address regulatory limitations in 20-year source control plan</b></li> </ul>	
Educate businesses, residents, and others who handle hazardous materials on ways to reduce pollution from their activities	Provide educational and outreach information that aids in source control activities	<ul style="list-style-type: none"> <li>Conduct education and outreach to businesses that discharge wastewater to sewers and stormwater to county MS4, and on King County properties</li> <li>Conduct education and outreach for septic systems</li> <li>Conduct education and outreach to property owners in areas eligible for Green Grants</li> </ul>	<ul style="list-style-type: none"> <li>Provide de-icing/washing training to KCIA tenants</li> <li>Conduct spill response training to County tenants</li> <li>Conduct Dirt Alert program on arsenic and lead exposure and yard cleanup</li> <li>Provide technical assistance, including on-site visits, to small quantity waste generators</li> <li>Conduct public education on household hazardous waste</li> <li>Perform targeted outreach to business and communities on particular hazardous waste issues</li> <li>Provide technical assistance to businesses on industrial wastewater discharges</li> <li>Offer certification program for septic pumpers, installers, and maintainers</li> <li>Conduct education and outreach for septic owners</li> <li>Conduct outreach on Green Grants Program</li> </ul>	
Monitor and evaluate source control efforts and revise plans accordingly	Assess program effectiveness and propose revisions	<ul style="list-style-type: none"> <li><b>Assess program effectiveness and incorporate outcomes into long-term plan</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Complete 20-year source control plan</b></li> </ul>	
Establish milestones and reporting requirements for source control activities	Report findings to Ecology and the SCWG	<ul style="list-style-type: none"> <li><b>Report all findings to Ecology</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Submit yearly updates to the source control status report</b></li> <li><b>Report long-term trends in the combined system by end of 2018</b></li> </ul>	
Increase the degree of inter- and intra-agency coordination to address source control issues that cannot be adequately resolved by one agency, department, or program	Enhance regional and internal coordination and communication efforts to improve the effectiveness of source control efforts	<ul style="list-style-type: none"> <li>Actively participate in a collaborative manner with regional partners and governmental agencies</li> <li><b>Develop a strategy to enhance long-term internal coordination</b></li> </ul>	<ul style="list-style-type: none"> <li>Participate in the SCWG and Duwamish Inspections Group; Train investigators to identify sources of contaminants</li> <li><b>Incorporate strategy to enhance long-term internal coordination into the 20-year source control plan</b></li> </ul>	
Evaluate whether controls are at the point where a sediment cleanup can proceed with some assurance that recontamination potential has been (or is being) reduced	Provide Ecology with information needed to make timely determinations	<ul style="list-style-type: none"> <li>Inform the appropriate authority of any identified problems</li> <li>Provide all collected information in regular submittals</li> <li>Participate in SCWG and Duwamish Inspections Group</li> </ul>	<ul style="list-style-type: none"> <li>Coordinate with Duwamish Inspections Group</li> <li>Submit yearly updates to the source control status report</li> <li>Participate regularly in both groups</li> </ul>	

<sup>a</sup> If no data is listed, outcome is completed by end of 5-year plan or is ongoing.

<sup>b</sup> With approval of funds from WLRD and if grant funding is available

## 2.0 King County's Ongoing Source Control Commitments in the Lower Duwamish Waterway

King County is actively involved in many source control efforts in the LDW. The County's track record shows a strong commitment to source control that has yielded substantial results. This chapter describes the ongoing LDW source control work of several King County divisions and a multi-jurisdictional program. This work is described in greater detail in Appendix B.

### 2.1 Wastewater Treatment Division

#### 2.1.1 Programs that Protect Water and Sediment Quality

WTD protects water and sediment quality in the LDW through the actions listed below, followed by a description of WTD's CSO Control Program:

- **Implementing the County's CSO Control Program, known as the Protecting Our Waters program.** The cornerstone of King County's Lower Duwamish Source Control Implementation Plan are four CSO control projects that will cost approximately \$225 million to implement. Planning or design for these projects is under way. These investments will build on the significant clean water investments the County has made in the LDW for over 50 years (see section 2.1.2 below).
- **Complying with National Pollutant Discharge Elimination System permits.** The NPDES permit for West Point includes discharge, loading, reporting, and monitoring requirements for all the facilities and outfalls associated with West Point, including CSO outfalls that discharge to the Duwamish River. Many actions required under the permit contribute to source control, in particular, pretreating industrial discharges and implementing the nine minimum controls for CSOs. More information is available at: <http://www.kingcounty.gov/environment/wtd/About/System/NPDES.aspx>.
- **King County Industrial Waste Program.** KCIW regulates industrial wastewater discharged into the King County wastewater system from industrial facilities. The program ensures that industrial facilities either treat wastewater to reduce harmful substances or use BMPs before discharging wastewater to the sanitary sewers. KCIW regulates approximately 180 facilities in the LDW, which represents approximately 25 percent of all the facilities regulated by the program.
- **Sediment Management Program.** WTD carries out a Sediment Management Plan (SMP) to remediate contaminated sediments near CSO outfalls identified on the state's Contaminated Site List. Sites in the LDW either have been addressed under the Elliot Bay Duwamish Restoration Program or are being addressed under the LDW Superfund cleanup. The County's efforts include past and ongoing source control work to identify and control the sources of pollution that may pose health or environmental problems if they accumulate in sediments and to prevent recontamination of cleanup areas in the LDW. To address gaps in knowledge of sources entering the system and the LDW, the County started several studies that will further refine source control efforts into the future.
- **Monitoring, inspecting, and maintaining WTD facilities.** WTD monitors flow at approximately 30 locations in LDW combined sewer basins and inspects sewer lines

using video equipment and other means on a seven-year cycle so that each sewer line is inspected at least once every seven years. CSO outfall pipes are inspected about every five years. More information is available at:

<http://www.kingcounty.gov/environment/wtd/Construction/Assets.aspx> and

<http://www.kingcounty.gov/environment/wastewater/CSI/FlowMonitoring.aspx>.

- **Educational and public outreach activities.** WTD offers educational information as part of its source control activities in the LDW. It maintains a website, performs community outreach, provides wastewater education and tour programs, and provides industrial waste educational programs, materials, and workshops. WTD partners with others on education such as participation in the annual Duwamish River Festival and in LHWMP activities. More information is available at: <http://www.kingcounty.gov/environment/wtd/Education.aspx>.
- **Participating in the RainWise Program.** WTD is working with SPU to offer the RainWise Program in selected portions of the WTD wastewater service area, including the LDW. Property owners who live in a targeted CSO basin in the LDW may be eligible for rebates for installing rain gardens or cisterns to help control stormwater runoff and CSOs. The County plans to offer this program through 2016. Information on the program is available at: <http://www.kingcounty.gov/environment/wastewater/CSO/BeRainwise.aspx>.
- **Funding the LDW Green Grants Program.** From 2011 through 2015, WTD has funded community projects, environmental education, and community outreach efforts in the Duwamish River Valley. These grants are to help improve air and water quality in the Duwamish watershed, support the successful implementation of CSO control projects in this area, and meet regulatory obligations for clean air. They are also offered to promote partnerships in the LDW with the goals of advancing source control for the LDW Superfund cleanup, developing local expertise in water and air quality protection, and enhancing small-scale environmental and economic opportunities in the community. WTD is expanding this program, as noted in Chapter 3.

Additional information is available at: <http://www.kingcounty.gov/environment/wtd.aspx>.

### **2.1.2 Protecting Our Waters Program, WTD's Combined Sewer Overflow Control Program**

The regional wastewater system includes CSO "relief points" in the combined sewer area of Seattle to prevent backups in homes and streets from extreme variations in stormwater volumes. These include 38 locations in the county system and about 90 in the SPU system. WTD has been implementing the County's CSO Control Program, Protecting Our Waters, since the late 1970s. King County has spent \$390 million on CSO control to date. Half of the County's 38 CSOs have completed projects to be controlled to the Washington State standard of no more than one untreated CSO discharge per year on a 20-year average.

In 2012, the King County Council approved an amendment to WTD's long-term CSO control plan that includes nine projects to control the remaining 14 uncontrolled CSOs by the end of 2030 at a total cost of \$710 million (2010 dollars; predicted to be over \$1 billion of future funds spent by completion). Current CSO control projects in construction cost \$179 million (2010 dollars). This amended plan prioritizes the control of LDW CSOs ahead of the others to support the Superfund cleanup efforts (Figure 2-1). CSO control will decrease untreated CSO volume by

an average of 117 million gallons per year (MGY) and CSO pollutant loadings, including PCBs, in the LDW by approximately 60 percent (Figure 2-2).<sup>1</sup>

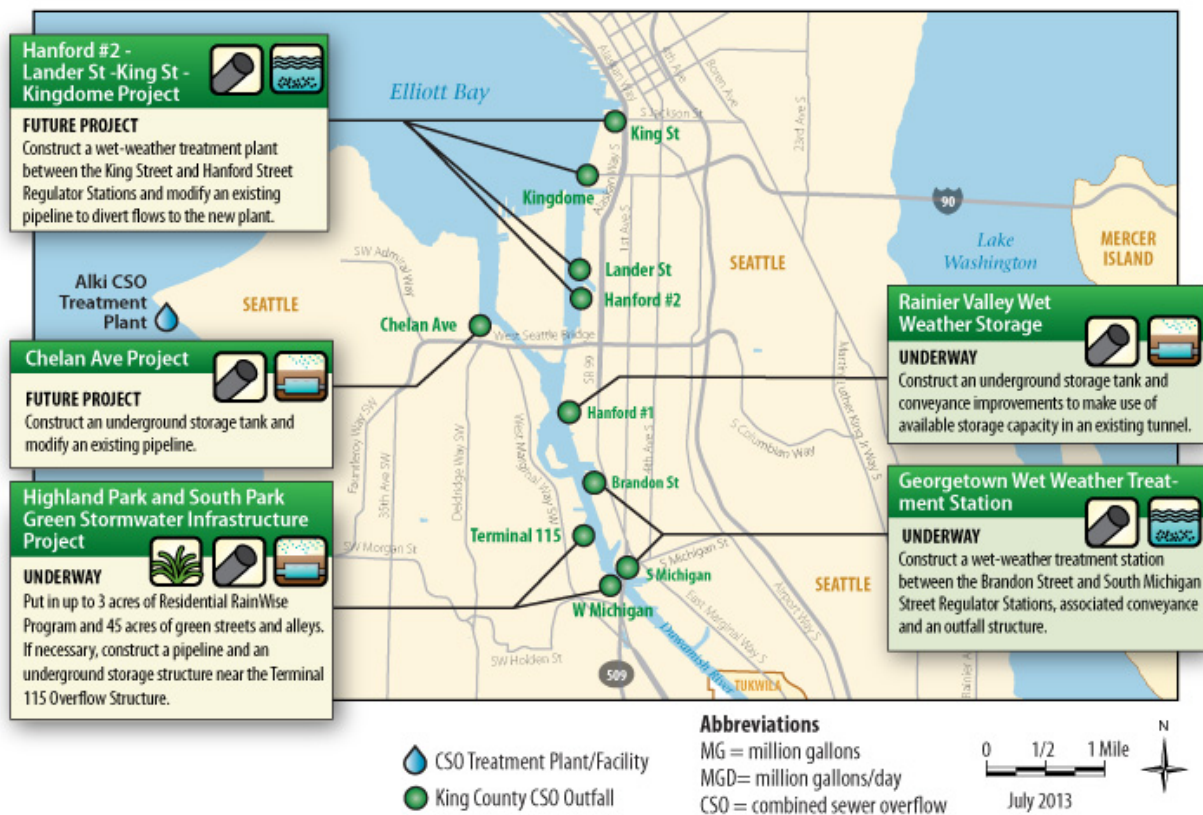
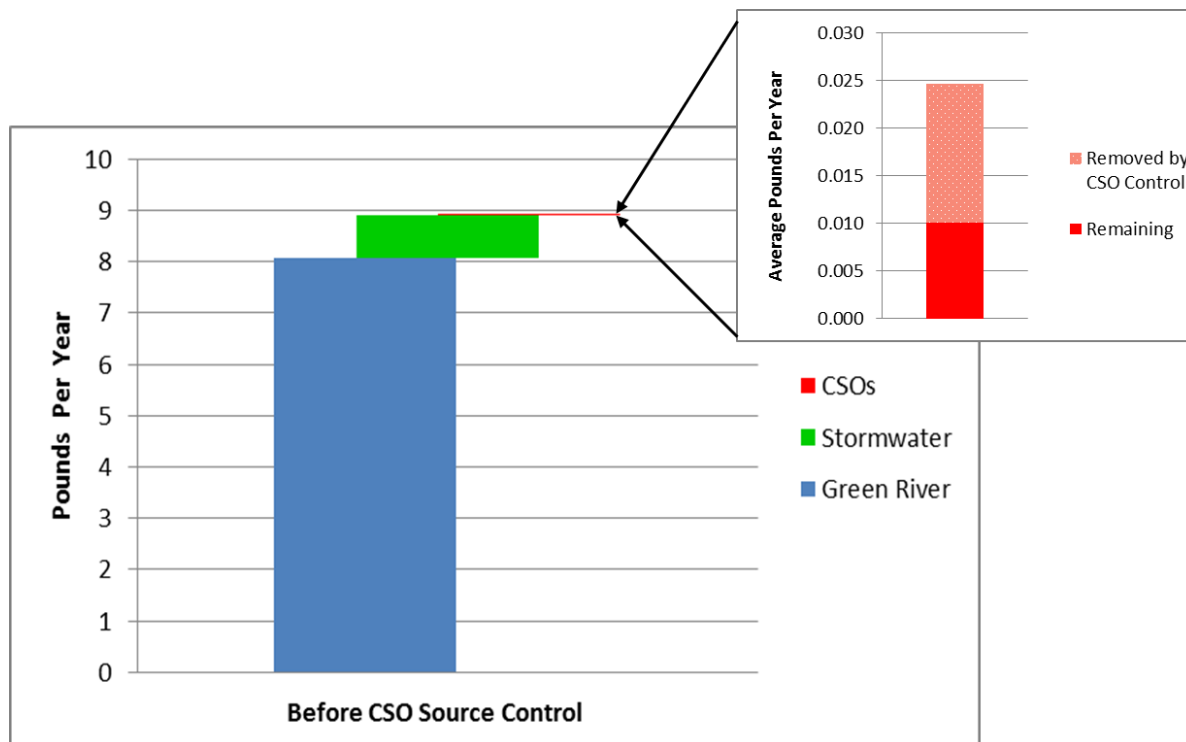


Figure 2-1. LDW Projects in WTD's Long-Term CSO Control Plan

<sup>1</sup> See Appendix B, pages B-2 to B-3, for details on how Figure 2-2 was calculated.



**Figure 2-2. Estimated Relative PCB Inputs to the Lower Duwamish Waterway**

Activities associated with the County's long-term CSO control plan in the 2014–2018 timeframe and designed to significantly reduce pollutant loadings in the LDW are as follows (in 2010 dollars):

- Rainier Valley Wet Weather Storage (Hanford #1) CSO control project \$19 million (M) will remove 100,000 gallons per year of untreated overflows
- Georgetown Wet Weather Treatment Station (Brandon/South Michigan) CSO control project (\$140 M) will remove 102 MGY
- Chelan Avenue CSO control project (\$52 M) will remove 13 MGY
- West Michigan and Terminal 115 CSO control project (\$15 M) will remove 1.5 MGY
- CSO treatment of Seattle's Henderson area CSOs (no net cost after reimbursement)
- Water Quality Assessment and Monitoring Study (\$3 M)
- GSI evaluations for CSO reduction in South Park and Highland Park neighborhoods (\$0.2 M) to reduce CSO storage by 0.2 MG
- CSO Control Program Review (\$1 M)
- Coordination with City of Seattle (\$0.6 M)

Once a CSO control project is constructed, the County implements post-construction monitoring. The purpose of the monitoring is to verify the effectiveness of CSO controls and demonstrate compliance with water and sediment quality standards and protection of designated uses and

sensitive areas. More information on the Protecting Our Waters Program is available at: <http://www.kingcounty.gov/environment/wastewater/CSO.aspx>.

## **2.2 Water and Land Resources Division**

WLRD helps protect the County's water and lands so that its residents can enjoy them safely today and for generations to come.

WLRD's Stormwater Management Program (SWMP) includes a number of programs that address pollutant prevention and reduction in stormwater discharges to the LDW and other receiving waters in King County. These actions and their associated agencies can be found in the 2013 SWMP document.<sup>2</sup> WLRD also coordinates the actions of other King County agencies that have responsibilities under the Municipal Stormwater NPDES permit. These programs are countywide in unincorporated areas. The programs WLRD primarily implements and that have most relevance to the LDW are as follows:

- The Source Control Program provides technical assistance, education, and code compliance activities to business and property owners. The goal of these activities is to reduce and eliminate existing or potential pollutant discharges to the MS4 and surface waters in unincorporated King County, a small portion of which are in the LDW drainage basin.
- The Facility Inspection Program ensures that stormwater flow control and water quality treatment facilities are properly functioning and appropriately maintained.
- The Illicit Connections and Illicit Discharges Detection and Elimination (IC/IDDE) Program addresses potential sources of stormwater pollution by conducting investigations, inspections, and follow-up actions to ensure compliance with King County's Water Quality Code; identifying illicit connections and discharges; and removing them.
- WLRD is responsible for mapping and documenting the MS4 in the County's jurisdiction, on the properties it owns or operates, and on properties that are discharging to the County's MS4.

More information is available at: <http://www.kingcounty.gov/environment/wlr.aspx>.

## **2.3 Solid Waste Division**

King County's SWD provides garbage transfer, disposal, and recycling services for residents and businesses in all of King County, except for Seattle and Milton which includes the southern portion of the LDW drainage basin. SWD also provides household hazardous waste disposal options and recycling education programs. SWD's customers live in both incorporated and unincorporated areas of the County, with the exception of the City of Seattle. Customers dispose of more than 800,000 tons of solid waste each year.

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<sup>2</sup> The SWMP is available at <http://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/stormwater-management-program/2013-swmp-and-appendices.pdf>.

SWD is responsible for the County's Brownfields Program, which provides technical and financial assistance to qualified private individuals and businesses, nonprofit organizations, and municipalities in King County to assess and clean up contaminated sites, called brownfields. SWD's Brownfields Program is funded with grants from EPA to conduct environmental site assessments (ESAs) on properties with confirmed or suspected contamination. Over the last 15 years, the program has conducted 11 Phase I and 22 Phase II ESAs resulting in a number of successful cleanup and redevelopment projects; some projects have been in the LDW drainage basin. Contaminates addressed include petroleum, tetrachloroethene (PCE), PCBs, PAHs, and metals. More information on SWD's Brownfields Program is available at: <http://your.kingcounty.gov/solidwaste/brownfields/index.asp>.

## 2.4 King County International Airport

KCIA, also known as Boeing Field, is one of the busiest primary non-hub airports in the nation. Located just five miles south of downtown Seattle, it averages more than 200,000 operations (takeoffs and landings) each year. KCIA's primary pathway to the LDW is stormwater. KCIA has been in compliance with stormwater regulations related to Ecology's NPDES permits, which include industrial, municipal, and construction stormwater general permits (CSGPs). KCIA complies with Ecology's regulations under the toxics cleanup, underground storage tank (UST), and dangerous waste programs:

- **Industrial Stormwater General Permit.** Ecology issued an ISGP for KCIA that covers industrial activities involving airport transportation. Ecology also has issued ISGPs for seven KCIA tenants. All other tenants operating at KCIA are covered under the KCIA ISGP and must comply with its specific requirements.
- **Municipal Stormwater General Permit.** As a custodial agency and county property, KCIA adheres to the County's Phase I Municipal Stormwater General Permit (MSGP). The permit regulates the discharges from MS4s owned or operated by King County. WLRD is the lead agency managing permit compliance for the County. Regulatory requirements and associated actions pertaining to the permit include mapping, development standards, structural stormwater controls, source control assessments, IC/IDDE, operation and maintenance, and property maintenance.
- **Construction Stormwater General Permit.** Development and construction at KCIA are performed in accordance with King County Code (KCC) Chapter 9.04, Surface Water Runoff Policy. For construction projects greater than one acre, KCIA and its tenants are also required to apply for coverage under Ecology's CSGP. The County's Department of Permitting and Environmental Review (DPER) also conducts inspections for building, commercial site development, demolition, and grading permits.
- **North Boeing Field/Georgetown Steam Plant Site Model Toxic Control Act Agreed Order.** In accordance with the Model Toxics Control Act (MTCA), Ecology signed Agreed Order DE 5685 with Boeing, KCIA, and the City of Seattle to facilitate remedial action at the North Boeing Field/Georgetown Steam Plant Site. Boeing, KCIA and the City are potential liable parties (PLPs) to the site. Under the Agreed Order, which became effective August 14, 2008, Ecology will conduct an RI/FS and interim actions, as needed.
- **Cleanup of Contaminated Sites.** As part of redevelopment activities, KCIA performs site investigations, feasibility studies, and site cleanups in accordance with Ecology's



Toxic Cleanup Program and MTCA requirements. Three KCIA independent projects are in various stages of investigations for eventual cleanup. KCIA notifies Ecology of contaminant release, investigation status, and planned remediation activities. Tenant site investigations are also under way and are being performed in accordance with MTCA or EPA Superfund requirements.

- **Management of Underground Storage Tanks.** KCIA ensures tenant UST compliance under Ecology's UST Program.
- **Dangerous Waste Disposal and Reporting.** KCIA, as a waste generator, complies with Ecology's Dangerous Waste Regulations and Resource Conservation and Recovery Act (RCRA) to ensure hazardous wastes are properly disposed of and recorded.
- **Hazardous Materials Abatement.** For demolition of building structures at KCIA, hazardous material surveys are performed in accordance with federal, state and local regulations. The surveys identify hazardous materials that require abatement and proper disposal prior to demolition. Asbestos-related activities are coordinated with DPER and with PSCAA.
- **De-icing and Washing Policy and Facilities.** To maximize stormwater protection, KCIA constructed de-icing and washing pads for aircraft. De-icing/wash pads were constructed to include oil-water separators before discharge to the sanitary sewer system. An aircraft de-icing and washing policy was established to ensure that tenants and operators are knowledgeable of approved de-icing locations and procedural requirements.
- **Capital Improvement Program.** KCIA has updated its infrastructure to support source control and remediation, including rehabilitating runways and taxiways, refurbishing stormwater pump stations, repairing/replacing damaged stormwater pipes, and updating aging ground vehicles. In addition, the program allows for redevelopment activities such as environmental investigations, hazardous materials abatement, building demolition, feasibility studies, and environmental cleanups.
- **Public Outreach and Education.** KCIA participates in outreach activities intended for educating tenants and operators to control discharges of pollutants into the KCIA stormwater system. Some of these activities include spill response and de-icing policy training and maintenance of the *Inhabit* website that informs readers on environmental accomplishments including green roofs, sound insulation, and stormwater protection. KCIA tenants are also reminded of the airport's ongoing compliance with environmental regulations during annual tenant assessments.

More information on KCIA's programs is available at:  
<http://www.kingcounty.gov/transportation/kcdot/Airport.aspx>.

## 2.5 Roads Services Division

King County's RSD designs, builds, operates, and maintains roads, bridges, and other features in the ROW in unincorporated areas of King County including part of the LDW drainage basin. RSD also has some responsibility regarding maintenance of the County's MS4 system, including street sweeping and vactoring, repairing, and cleaning stormwater flow control and water quality treatment facilities, catch basins, and conveyance systems (pipes and ditches). These efforts help address sediments and associated contaminants, and petroleum hydrocarbons, PAHs, and metals.

Relevant RSD programs are as follows:

- **Regional Road Maintenance Endangered Species Act Program.** King County implements the Regional Road Maintenance Endangered Species Act (ESA) Program Guidelines, which are designed to minimize the impacts of road maintenance activities on biota in receiving water bodies. The program covers unincorporated King County and areas in participating cities. It emphasizes training and education for all Traffic and Roads Maintenance staff to promote the use of BMPs to protect receiving water bodies from pollutants. The focus is on sediments and associated contaminants, but also includes petroleum hydrocarbons, PAHs, and metals.
- **Snow and Ice Response Program.** This program applies sand, salt, and anti-icer to roads in unincorporated King County and the cities that contract with the RSD during inclement weather. Improved traction reduces the likelihood and severity of vehicle accidents, which, in turn, limits and minimizes spills of automotive fluids. Recovery of the sand through sweeping and catch basin cleaning minimizes the amount of sediment that is transported downstream to receiving water bodies.
- **Routine Road Maintenance.** The Roads Maintenance Section maintains road ROW and associated stormwater conveyance systems throughout unincorporated King County. Activities include cleanup of automotive fluid spills, removal of illegally dumped solid waste, removal of landslide material, snow and ice response, stabilization of eroding soils, street sweeping, litter removal, shoulder grading, removal of creosote-treated timbers, and sediment removal from catch basins, pipes, ditches, and stormwater ponds.

More information is available at: <http://www.kingcounty.gov/transportation/kcdot/Roads.aspx>.

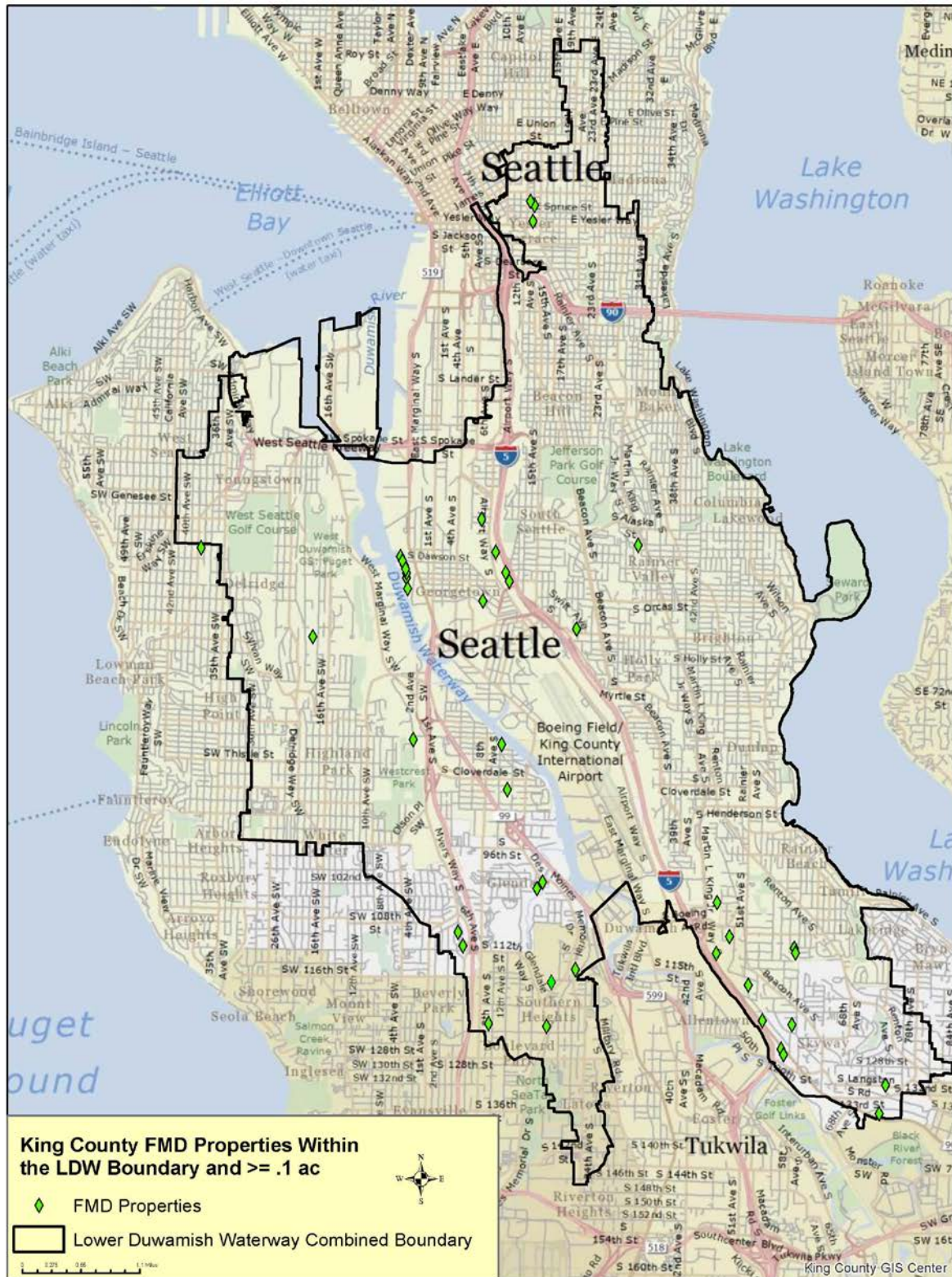
## 2.6 Facilities Management Division

King County's FMD operates and manages the County's capital assets by developing and maintaining cost-conscious, sustainable, high-quality facilities and environments. FMD ensures that developed sites and vacant sites with stormwater facilities are inspected annually for stormwater and water quality compliance.

FMD is the custodial agent for seven parcels located directly on the Duwamish Waterway, referred to as the Harbor Bond properties, and for four developed parcels and 137 vacant parcels scattered in the Lower Duwamish Superfund Source Area (Figure 2-3). The Harbor Bond properties have been leased to a variety of tenants for almost a century for industrial and commercial purposes that benefitted from both rail and water access. A number of programs, permits, and activities serve to reduce the possibility of recontamination from these parcels.

More information on FMD's programs is available at:

<http://www.kingcounty.gov/operations/FacilitiesManagement.aspx>.



**Figure 2-3. King County Facilities Management Division Properties in the Lower Duwamish Waterway**

### **2.6.1 Harbor Bond Properties**

The Harbor Bond properties occupy the right bank of the Duwamish River from River Mile (RM) 1.0 to 1.2. FMD contracts with WLRD to perform water quality compliance inspections at these Duwamish properties every five years in compliance with the County's Municipal NPDES Stormwater Permit. Inspections ensure the stormwater collection systems are maintained and operated according to the approved designs and stormwater pollution prevention plans. Inspections also confirm that water quality BMPS are in place.

As custodial agent for King County, FMD administers leases with all these tenants and ensures the leases, as they are renewed, contain specific and comprehensive language requiring conformance with the most current applicable environmental regulations, including those for stormwater.

FMD will continue to coordinate and assist where possible to implement elements of the Ecology's January 2011 LDW Source Control Action Plan (RM 1.0 to 1.2).

### **2.6.2 Other Properties**

The County manages four other developed parcels in the contributing area. These developed parcels are inspected annually under contract with WLRD for stormwater facility compliance, and every five years for water quality compliance. The remaining 137 properties are scattered throughout the rest of the contributing area. Most of the parcels are small, vacant properties that have come to the County through the failure to pay property taxes (Tax Title Properties) or as the result of open space dedications through formal platting processes.

These properties have recently been folded into WLRD's stormwater inspection program. If constructed drainage facilities are discovered on the property, the parcel becomes part of the annual inspection and compliance program. If there are no drainage improvements, the parcel is inspected to determine if there are potential sources of water pollution (usually illegal dumping of polluting wastes). The water quality inspection occurs on a five-year rotation. Discovered drainage deficiencies or polluting situations are corrected by Roads Maintenance crews or the Solid Waste Community Litter Program. The 105 parcels less than a tenth of an acre are managed on a complaint basis.

## **2.7 Environmental Health Services Division, Public Health – Seattle & King County**

The mission of Public Health is to identify and promote the conditions under which all people can live in healthy communities and can achieve optimum health. Public Health's Environmental Health Services Division supports efforts to control point sources that can potentially contribute to sediment contamination load in the LDW. This is accomplished through regulatory and oversight activities that do the following:

- Minimize potential human and environmental exposures to sewage and chemicals released from properties that have on-site sewage (septic) systems in the LDW drainage basin
- Administer and enforce state and local regulations governing the safe handling of solid waste; seven permitted solid waste facilities and 30 non-permitted solid waste facilities discharge into the LDW drainage basin

- Continue other regulatory activities related to the release of wastes from plumbing structures, food facilities, and water recreation facilities into public sewer systems
- Help prevent pollutants from entering the LDW through non-regulatory activities such as educational and outreach programs and materials.

More information on Public Health's programs is available at:  
<http://www.kingcounty.gov/healthservices/health.aspx>.

## **2.8 Local Hazardous Waste Management Program**

King County's LHWMP is a multi-agency program that covers all incorporated cities and unincorporated county areas. Participating agencies include the County's SWD and WLRD, Public Health, SPU, and the Sound Cities Association. The program implements the moderate-risk waste plan required by Chapter 70.105 Revised Code of Washington (RCW), as updated most recently in 2010 and approved by Ecology. It addresses hazardous wastes generated by residents and generated in small quantities by businesses and institutions.

LHWMP's services include household hazardous waste collection, public education, small quantity generator technical assistance, small quantity generator waste collection, and targeted outreach to communities and businesses. These efforts help keep pollutants out of surface waters, including the LDW, and the environment.

Of particular importance to the LDW source control efforts are LHWMP's on-site technical assistance visits to small businesses and institutions. LHWMP investigators provide consultation services throughout the County; in 2013, they visited more than 500 locations, including many in the LDW.

LHWMP also works with selected industries and the various ethnic groups known to work in each industry. Currently, the program is focusing on dry-cleaning companies to explore options for shifting away from perchloroethylene (PERC) and other chlorinated solvent spot cleaners. The program is also working with artists to address the wide variety of hazardous products they use, with nail salons to address worker and customer exposures to hazardous solvent vapor, with janitorial/custodial services regarding safe use of cleaning products and promotion of safer alternative cleaners, and with landscape service companies and their workers to promote proper use of pesticides and pesticide-reduction techniques.

More information on LHWMP's services is available at: <http://www.lhwmp.org/home/>.



### 3.0 Additional and Accelerated Source Control Actions in 2014–2018

This chapter describes the additional and accelerated actions that King County will carry out in 2014-2018 to expand and increase the benefits of its ongoing work to control pollutants from entering the LDW. These actions, together with the ongoing source control efforts discussed in Chapters 2 and Appendix B, form King County's portion of Ecology's updated LDW Source Control Strategy, which is an appendix to EPA's Proposed Plan for the LDW Superfund Site. Ecology has asked the County, the City of Seattle, and EPA to develop implementation plans for 2014-2018 to be included in Ecology's updated strategy. Per Ecology's direction, the County's actions listed in this chapter are designed to improve sediment quality and they are in addition to the County's existing LDW source control requirements and commitments or will be completed sooner than required. Whenever required by the County Charter or other applicable law, the County will seek authorization and appropriation from the King County Council to implement any activities not currently authorized and covered by an appropriation.

The actions include expanded sampling, source identification, source tracing, green grants, mapping, stormwater line cleaning, and development of a 20-year LDW source control implementation plan. The results of the actions will provide helpful information to ensure that the County's ongoing and planned LDW source control efforts are as effective as possible and meet or exceed permit requirements and other commitments.

The context on how these actions fit into the County's overall LDW source control efforts is provided in Table 1-1 and Appendix B.

The specific additional and accelerated actions will be carried out by four county divisions<sup>1</sup>:

- **Wastewater Treatment Division in the Department of Natural Resources and Parks.** WTD intends to implement the CSO control plan, which will reduce the volume of current overflows of untreated stormwater and wastewater by an average of 117 MGY and CSO pollutant loadings by approximately 60 percent. To supplement CSO control, particularly in basins not yet controlled, WTD will carry out additional identification and tracing efforts to identify sources of COCs in the combined sewer basins that could impair current and future treatment plant performance or overflow into the LDW; continue the Green Grants Program which provides funding for air or water quality improvement projects; and implement other efforts to support the successful implementation of future CSO control projects in the LDW.
- **Water and Land Resources Division in the Department of Natural Resources and Parks.** WLRD will complete its mapping of the County's MS4 in the LDW by June 30, 2015. This action is being completed sooner than required by the County's stormwater NPDES permit. WLRD also plans to increase the frequency of source control inspections in the South 96th Street Corridor, which is home to a number of industrial activities in the LDW drainage basin.
- **King County International Airport in the Department of Transportation.** KCIA will conduct annual sampling and source tracing in its drainage system in 2014-2018.

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<sup>1</sup> Estimated cost information for these proposed actions will, to the extent possible, be provided in the final draft of this plan.



- **Roads Services Division in the Department of Transportation.** With funding made available from WLRD, RSD will carry out additional maintenance of the County's ROW stormwater lines in the LDW source area during 2014-2018.

Sections 3.1 through 3.4 below provide a brief summary of the work of each division and a description of the divisions' additional and accelerated actions. Section 3.5 discusses the development of a 20-year LDW source control implementation plan, and Section 3.6 focuses on how the County will report to Ecology on its progress.

The County's additional and accelerated source control actions proposed during 2014 to 2018 are projected to cost over \$3.5 million. More detail on the divisions' ongoing LDW source control efforts, including a multi-jurisdictional program in which the County participates, are provided in Chapter 2 and Appendix B.

### **3.1 Wastewater Treatment Division Additional and Accelerated Actions in 2014-2018**

WTD protects water quality and prevents water pollution by providing regional wastewater treatment to 17 cities and 17 local utilities. WTD serves about 1.5 million people in a 420-square-mile service area, including most urban areas of King County and parts of south Snohomish County and northeast Pierce County. The LDW is included in WTD's service area (Figure 3-1). WTD's treatment plants operate under and comply with NPDES permits that outline the conditions in which the County can discharge treated wastewater.<sup>2</sup> Today, on an annual average, over 85 percent of the stormwater in the entire system's combined sewer basins is captured and treated at West Point. The remaining flow released during CSOs, made up of approximately 90 percent stormwater and 10 percent wastewater, benefits from the source control actions discussed here.

The additional and accelerated actions that WTD intends to carry out to supplement its ongoing LDW source control efforts and commitments include source identification and tracing and an expanded LDW Green Grants Program. These actions are described below. Following these descriptions, Table 3-1 presents a summary of WTD's LDW additional and accelerated source control actions in 2014-2018.

#### **3.1.1 Source Identification and Tracing**

The goal of source tracing COCs that enter the County's combined sewer is to protect the treatment efficiency at West Point, ensure the proper performance of future CSO treatment facilities in the LDW, and minimize pollutants in the remaining flow in the combined system released to the LDW. These goals protect river sediments near CSO discharge points following cleanup actions by controlling sources to reduce the potential for sediment recontamination. Source tracing is generally achieved through ongoing business and industrial waste inspections and source identification through sampling. These activities allow for the identification of possible sources of COCs to the combined sewer system and help inform appropriate authorities of mitigation options.

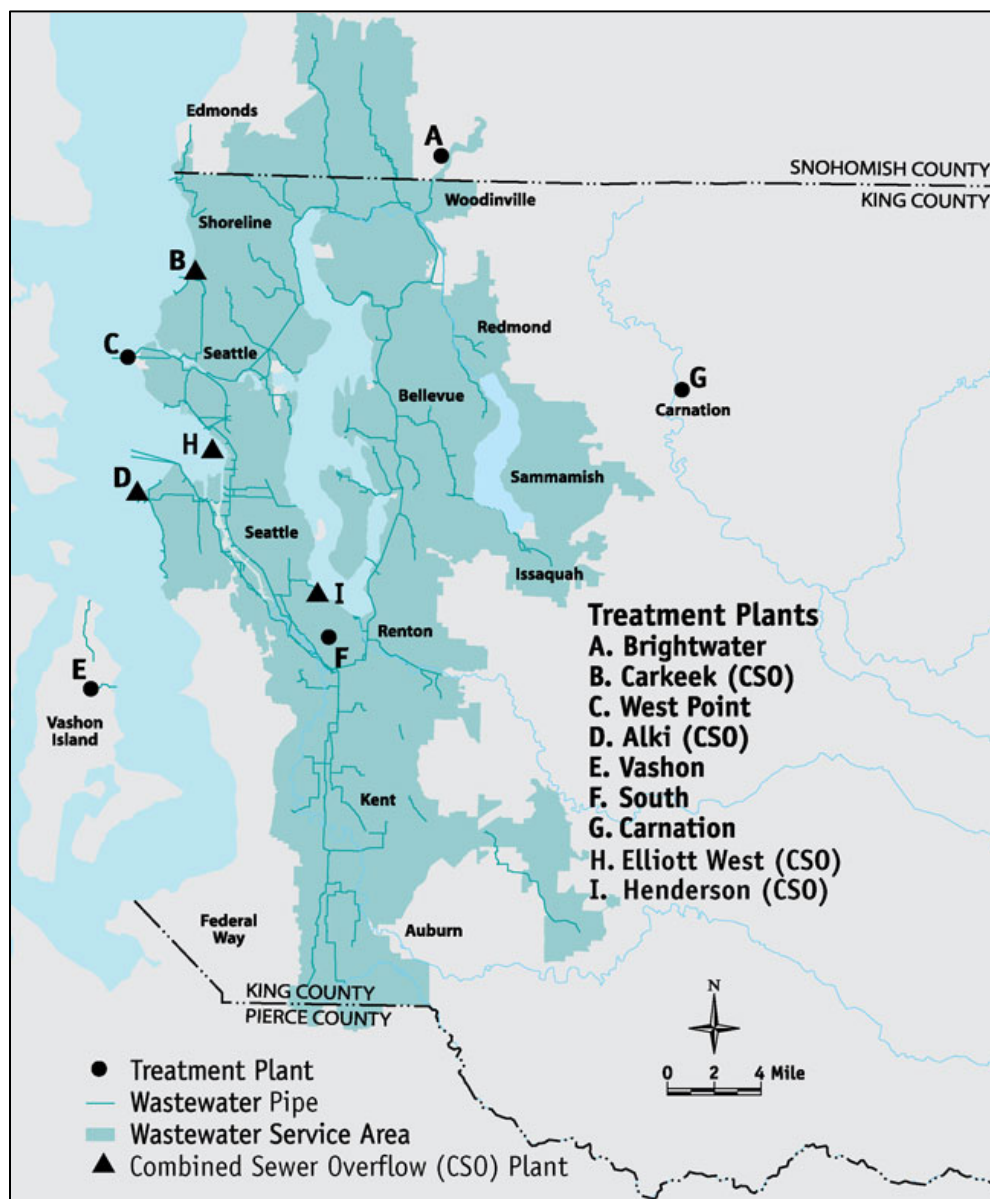
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<sup>2</sup> Information on the NPDES permits for the County's wastewater treatment facilities is available at <http://www.kingcounty.gov/environment/wtd/About/System/NPDES.aspx>.



## Background

Since 2003, WTD has systematically conducted sampling in combined sewer sub-basins to identify and control sources of COCs. The data helped characterize the chemistry of CSO basins and identified several elevated levels of contaminants that were traced back to their sources. The information on sources was provided to the appropriate regulatory agency. Depending on the type of source, one of several different agencies could have the regulatory authority to address the problem. The agencies include KCIW, City of Seattle, Ecology, and EPA.



**Figure 3-1. King County's Wastewater Service Area**

If a source was found to come from a business or industry that operates under a KCIW discharge permit, KCIW works with that business or agency to control the source or take appropriate enforcement action. For example, in-line sediments in the combined sewer were used to assess the impacts of a specific discharge in the Eighth Avenue CSO Basin. KCIW staff worked with

the discharger to implement source control measures to better control PCB releases. In situations where up-line sampling did not identify any likely sources, some CSO structures were cleaned to determine if the existing levels of in-line sediment contamination were historical or from some ongoing source.

Localized efforts are continuing in the Brandon and South Michigan CSO basins to determine if potential COC sources are connected to sewer, stormwater, or groundwater inputs. These efforts, along with studies on CSO basin inputs, atmospheric deposition, Green River inputs, and nearfield discharge monitoring, will help target further source tracing efforts and coordination with the appropriate enforcement agencies. More information on the studies is provided in Chapter 2 and Appendix B.

Once CSO basins have been initially characterized and targeted elevated levels have been traced, to the extent possible, to their source and controlled, routine screening will be needed over time. A variety of factors can lead to new or increased releases to the combined system. A basin-scale study of properties in the Duwamish/Diagonal drainage basin documented a high rate of property turnover during the five years since the original round of inspections. As it is likely there will be changes in staff, businesses, and on-site activities over time, ongoing screening will be needed to ensure that new releases do not occur. As uncontrolled CSOs are controlled, WTD will modify the inspections and tracing in those basins accordingly.

### **Scope of Work**

WTD's source identification and tracing efforts in 2014-2018 include business inspections, source identification and tracing, controlling sources, and program assessment. Descriptions of these components follow.

#### *Business Inspections*

Various County agencies, as well as other agencies such as SPU, Ecology, and EPA, conduct ongoing business inspections in the LDW. The inspections are an important component in controlling COCs in the LDW. They help identify potential sources of contaminants from on-site activities; needed BMPs to minimize or prevent stormwater contamination; and, if there are any releases to the sewer, appropriate pretreatment actions that are required. The inspections also consider the conveyance system and possible illicit connections. County inspectors share findings with staff from SPU, Ecology, and EPA and work collaboratively in cases where multiple jurisdictions are involved. There have been a number of successful actions in the past 10 years, and the County will continue participating in joint inspections as needed and fulfill its role in joint efforts to mitigate point sources and take legal action when necessary where the County has jurisdiction and authority.

To enhance business inspection capability and to support Ecology's Water Quality Program's effectiveness, WTD established a three-year Memorandum of Agreement with Ecology in 2012 to support a full-time water quality inspector position. The purpose of this position is to perform surveys in the LDW focusing on stormwater in the combined area. The Brandon and South Michigan CSO basins were selected for the surveys based on the County's plan and schedule for the construction of the Georgetown Wet Weather Treatment Station, that addresses the Brandon and South Michigan CSO basins. The surveys will provide information on compliance with stormwater and hazardous waste generation, storage, and disposal regulations. Identified non-compliance issues will be pursued by WTD directly or in partnership with the appropriate authorities to address. Inspection results can be used to identify problem areas needing more

attention and potential source screening and tracing activities. The summary of results in combined sewer areas will be used to prioritize future work based on the potential to pollute and consequences of pollution. WTD will then work with the various inspection programs to allocate resources accordingly.

#### *Source Identification and Tracing*

WTD collects chemistry samples at key locations in the CSO drainage area of the LDW. Sampling data provides information on potential sources in the combined sewer system, characterizes source concentrations, identifies elevated levels of COCs in the combined sewer system that can potentially be traced back to their source, and provides the dataset to track long-term trends in overall source concentrations.

A variety of sampling methods is employed, and it is generally understood that no single method is most effective in tracing sources and each has their limitations. The most common types of samples used by the County to trace sources are as follows:

- **In-line solids grab samples.** The County has established sampling and analysis plans (SAPs) specific to the collection and analysis of in-line solids grab samples from combined sewer lines (Figure 3-2). The same or equivalent sampling procedure is used by the City of Seattle. Using standardized procedures helps to compare data across basins, over time and between jurisdictions. These samples can be collected at various access points in the system (if there are enough solids in combined lines to collect) to help narrow the area of interest affected by a source. In-line solid grab samples can often include historical material that has collected over time in the system.
- **In-line sediment traps.** The County has established SAPs specific to the collection and analysis of in-line sediment trap samples from within combined sewer lines (Figure 3-2). Traps are designed to collect suspended solids from combined sewage and stormwater flows during moderate to high flows and provide useful information about possible ongoing sources. Sediment traps are typically deployed over a period of time (for example, three to nine months, depending on location) to allow for the accumulation of sufficient material to conduct a larger suite of analyses. Similar to in-line solids grab samples, data from sediment traps enable the County to narrow the areas of interest. In-line solids grab samples represent the heavier materials such as sand and gravel size particles that accumulate over time at the bottom of the pipe (Figure 3-2). Sediment traps provide different information compared to solids grab samples for a number of reasons, including the following:
  - Sediment traps collect more of the suspended material, which has finer-sized particles or lighter material, where contaminants are typically found in higher concentrations. This enables the County another line of evidence to identify sources of COCs.
  - They provide an estimate of the average particulate chemical concentrations passing through the system over time.
  - They can be more representative of current ongoing sources compared to accumulated sediments in the lines, which can often include historical contamination.



**Figure 3-2. Example of In-line Solids Grab Samples and In-line Sediment Traps**

- Catch basin grab samples.** Catch basin grab samples are used for characterizing stormwater-associated solids that have accumulated in the catch basins on or near a specific property, as opposed to the bottom of a combined sewer line that typically collects inputs from many properties. Catch basin samples are collected to provide information about the quality of stormwater runoff and, in some cases, could provide useful information about the contribution of a particular chemical from a narrow drainage area or a specific property.

Whether the County implements in-line solids grab samples or sediment traps, the County will expand this program for strategic locations starting in the main combined sewer lines to maximize its coverage. The data will be compared to regional levels and assessed to determine if any follow-up source tracing actions are needed. While there are no regulatory levels established for in-line solids, catch basin, or sediment traps, the County and the City of Seattle (1) compare results to the State Sediment Management Standards (SMS) cleanup screening levels for benthic organisms and the state MTCA cleanup standards and (2) set target levels based on the potential to recontaminate the river or cause downstream sewer system impacts. These target levels may be refined over time by the LDW SCWG or its successor. Areas where elevated concentrations above the target levels are observed require follow-up and potentially additional sampling up the pipe to further narrow and identify specific sources of COCs. If the source of the elevated concentrations can be identified, actions will be triggered to control the source, depending on regulatory authority.

#### *Controlling Sources*

Once a source has been identified, WTD takes action and works with the appropriate regulatory agency and with the property owner to control the release. This could require implementation of stormwater BMPs, treatment, industrial waste pretreatment, or site cleanup. The County will coordinate with various authorities as needed during the process to track the progress of source control actions.

Sometimes no specific sources are identified, and historical contamination of in-line solids is the likely source. In these situations, line cleaning may be needed once any ongoing sources have been adequately controlled. The County will work with local line owners to have the affected

line segments cleaned; the County is responsible for the trunk lines. Additional sampling following cleaning would be conducted to determine if the problem is resolved or ongoing sources keep the solids concentrations elevated and require additional source tracing efforts.

#### *Program Assessment*

The growing body of screening and source tracing sampling throughout the combined system is collected into a database that allows for trend analysis over time. The dataset allows the County to assess for changes in source concentrations and track effectiveness of the overall source control program in the combined basins over time.

#### **Anticipated Actions in 2014-2018**

The source identification and tracing deliverables include sampling, stormwater assessment, and identification of any long-term trends. They are described below and summarized in Table 3-1.

#### *Sampling*

WTD will collect in-line samples (in-line solids grab samples and sediment traps) in uncontrolled combined basins (Hanford, Brandon, South Michigan, West Michigan, and Terminal-115). Additional screening will be done in controlled basins (Norfolk, Eighth Avenue, and Diagonal siphon) based on identified concerns from ongoing business inspections, spill reports, or other appropriate triggers. Screening will also be done following any King County cleaning of facilities in the system once enough solids have accumulated to collect samples. Sampling will be basin-specific to determine if new sources are occurring in the basin and, when found, will be traced back to their origin using additional upstream sampling. As CSOs become controlled, sampling efforts in those basins will be reduced to screening when concerns are identified.

#### *Stormwater Assessment*

As a part of its source tracing program, WTD intends to have the Ecology inspector position, funded by WTD, to complete the expanded stormwater inspections assessment in the Brandon CSO basin and in selected subareas in the South Michigan CSO basin. Upon evaluation of the data, a plan for additional source control activities will be developed, as needed.

#### *Long-Term Trends*

By collecting and tracking source data over time, WTD will be able to identify any long-term trends in concentrations of contaminants in the combined sewer system.

### **3.1.2 Lower Duwamish Waterway Green Grants Program**

From 2011 through 2015, WTD has grant funding available for air or water quality improvement projects, environmental education, and community outreach efforts within the Duwamish River Valley. These grants are to help improve air and water quality in the Duwamish watershed, support the successful implementation of future CSO prevention projects in this area, and meet regulatory obligations for clean air. They are also offered to promote partnerships in the Duwamish area with the goals of advancing source control for the Superfund cleanup, developing local expertise in water and air quality protection, and enhancing small-scale environmental and economic opportunities in the community. Projects can be both structural and non-structural stormwater BMPs.

Currently, this program is set to sunset after the 2015 award round. WTD has asked for funding under the “Our Waters” program budget for the 2015–2016 biennium to support an ongoing and potentially expanded LDW Green Grants Program that would continue to deliver air and water

quality benefits to the areas surrounding the Duwamish River. The Green Grants target a community that has disproportionate human health outcomes and environmental burdens and improves equity and social justice by supporting the community's vision for vibrant, healthy neighborhoods around the Duwamish River.

#### **Scope of Work**

WTD will ask for funding under the "Our Waters" program budget for the 2015–2016 biennium to modify and expand the Green Grants Program in 2016 and beyond. Implementation of the projects funded by the program will help support WTD's overall source control efforts in the LDW.

#### **3.1.3 Regulatory Review**

Effective source control relies on the authority to regulate the release of contaminants to receiving waters. This authority is spread over several agencies and jurisdictions. The existing regulatory authorities have several areas where the authority is not clarified or does not exist for certain types of releases. WTD is committed to resolving these areas of uncertainty with partner agencies to improve the effectiveness of source control.

In 2014–2018, WTD will conduct a review of existing regulations that currently address source control authority to identify limits to existing authorities that might represent a limitation to conducting and enforcing source control. Areas needing resolution will be provided to the internal team preparing the 20-year Source Control Implementation Plan to develop proposals to resolve the issues including revising regulations when necessary.

**Table 3-1. Summary of Wastewater Treatment Division  
Additional and Accelerated Actions in 2014-2018**

Additional and Accelerated Source Control Action	Completion Date
<p><b>Source Identification and Tracing</b></p> <p>Expanded Sampling:</p> <ul style="list-style-type: none"> <li>• Develop an annual sampling plan (the plan will be based on previous in-line trap data, data and information provided by other agencies, and or other factors such as previous line cleaning and follow-up sampling)</li> <li>• Deploy 2-4 sediment traps in areas of focus</li> <li>• Collect 4-8 sediments grab samples in areas of focus</li> <li>• Sample in each uncontrolled basin and controlled basins where a problem is identified</li> <li>• Provide Ecology with a summary from previous year's sampling activities for Ecology's LDW Source Control Status Report</li> </ul> <p>Stormwater Assessment:</p> <ul style="list-style-type: none"> <li>• Complete inspections by Ecology inspector, whose position is funded by King County</li> <li>• Complete a report to King County</li> <li>• Evaluate the information and determine potential follow-up actions</li> <li>• Conduct studies on CSO basin inputs, atmospheric deposition, Green River inputs</li> <li>• Provide Ecology with a summary from previous year's activities for Ecology's LDW Source Control Status Report</li> <li>• Report to Ecology on long-term trends</li> </ul>	<p>Annually, by December 31</p> <p>Rotating uncontrolled basins or identified problems in controlled basins annually</p> <p>Rotating uncontrolled basins or identified problems in controlled basins annually</p> <p>Complete a full rotation of all basins in 5 years</p> <p>Annually</p> <p>By the end of 2015</p> <p>By the end of 2015</p> <p>By the end of 2016</p> <p>By the end of 2015</p> <p>Annually, through 2015</p> <p>By the end of 2018</p>
<p><b>Regulatory Review</b></p> <p>Conduct a review of existing regulations and identify areas needing changes</p>	<p>By the end of 2017</p>
<p><b>LDW Green Grants Program</b></p> <p>Request funding under the "Our Waters" program budget for the 2015-2016 biennium to modify and expand the Green Grants Program in 2016 and beyond.</p> <p>Provide Ecology with a summary from previous year's activities for Ecology's LDW Source Control Status Report</p>	<p>Continue beyond current 2015 sunset</p> <p>Annually</p>

### **3.2 Water and Land Resources Division Additional and Accelerated Actions in 2014-2018**

WLRD helps to protect the County's water and lands so that its residents can enjoy them safely today and for generations to come. The division provides diverse services, such as water quality studies and analyses, river and floodplain management, watershed basin stewardship, rural and agricultural services, and implementation of and compliance with the County's Phase 1 Municipal Stormwater NPDES permit, which regulates the discharges from County-owned MS4s.<sup>3</sup>

The LDW source control actions that WLRD intends to carry out to supplement its ongoing LDW source control efforts and commitments include completing the County's MS4 mapping in the LDW sooner than required and conducting more frequent source control inspections of the South 96th Street Corridor. These actions are described below, followed by a summary of the actions provided in Table 3-2.

#### **3.2.1 Mapping of Municipal Separate Storm Sewer Systems**

In accordance with the NPDES Municipal Stormwater Permit (*S5.C.2 Municipal Separate Storm Sewer System Mapping and Documentation*), King County is required to map and document the MS4 on the properties it owns or operates and on properties that discharge to the MS4. Since the issuance of the municipal stormwater NPDES permit in 1995, the County's MS4 mapping program has been conducted by the various county departments and divisions that hold properties that contain MS4 structures and facilities.

##### **Background**

As technology has changed and the permit requirements have evolved, it has become necessary to centralize all of the varying formats of stormwater mapping information, such as paper, spreadsheets, images, computer-aided design (CAD), and geographic information system (GIS), to a standardized information system that includes GIS. Since 2011, King County has moved to consolidate the various programs into a central effort in WLRD through the Stormwater Data Migration Project. This effort has included the development of a central mapping database, collection of mapping data from the custodial agencies, and standardization of field mapping protocols. Having this centralized map and supporting information system of the County's MS4 is foundational to its various stormwater management programs. The central mapping database will be made available for use by King County staff in mid-2014. The mapping information system will allow these programs to more knowledgeably and effectively supplement, query, and analyze the stormwater system being managed.

Currently field mapping priorities include completing the mapping in the LDW footprint, supporting Illicit Connections and Illicit Discharges Detection and Elimination (IC/IDDE) Program needs, mapping Total Maximum Daily Load (TMDL) areas contained in the current permit, and mapping all higher density rural sub-basins in unincorporated King County to meet current municipal stormwater NPDES permit requirements.

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<sup>3</sup> Information on the County's Phase 1 NPDES Municipal Stormwater permit is available at <http://www.ecy.wa.gov/programs/wq/stormwater/municipal/phaseIpermit/phipermit.html>.



### **Scope of Work**

King County's 2013 Municipal Stormwater NPDES Phase I permit requires that the County's MS4 and connections to the MS4 in the urban and higher density rural sub-basins in unincorporated King County be mapped by December 31, 2017. In the LDW drainage basin, the County's MS4 exists in the unincorporated portions and in incorporated areas where the County owns or operates properties (Figure 3-3).

The County has scheduled the MS4 mapping in the LDW drainage basin to be completed ahead of the other urban areas. It plans on fulfilling the permit's mapping requirements for this area by June 30, 2015, well ahead of the required schedule. The majority of this area has already been mapped by the various custodial agencies. The focus of this accelerated action is to migrate the various datasets into a single standardized database through the County's Stormwater Data Migration Project. The County will conduct gap and connectivity analyses to determine the system's functionality and will highlight areas where further information is needed to get a better understanding of the stormwater system in this and all other areas of the County to target field mapping effort. These analyses will also determine where additional field work is needed to improve the data quality.

The mapping actions in the LDW drainage basin that will be completed by the end of June 2015 are provided in Table 3-2.

### **3.2.2 Source Control Inspections of the South 96th Street Corridor**

The majority of the potential pollutant-generating sites in unincorporated King County that are in the drainage boundary of the LDW Superfund cleanup site are located between State Route 509 and the Duwamish River, and north of South 102nd Street to the border with the City of Seattle. This area is commonly referred to the South 96th Street Corridor (Figure 3-4).

#### **Background**

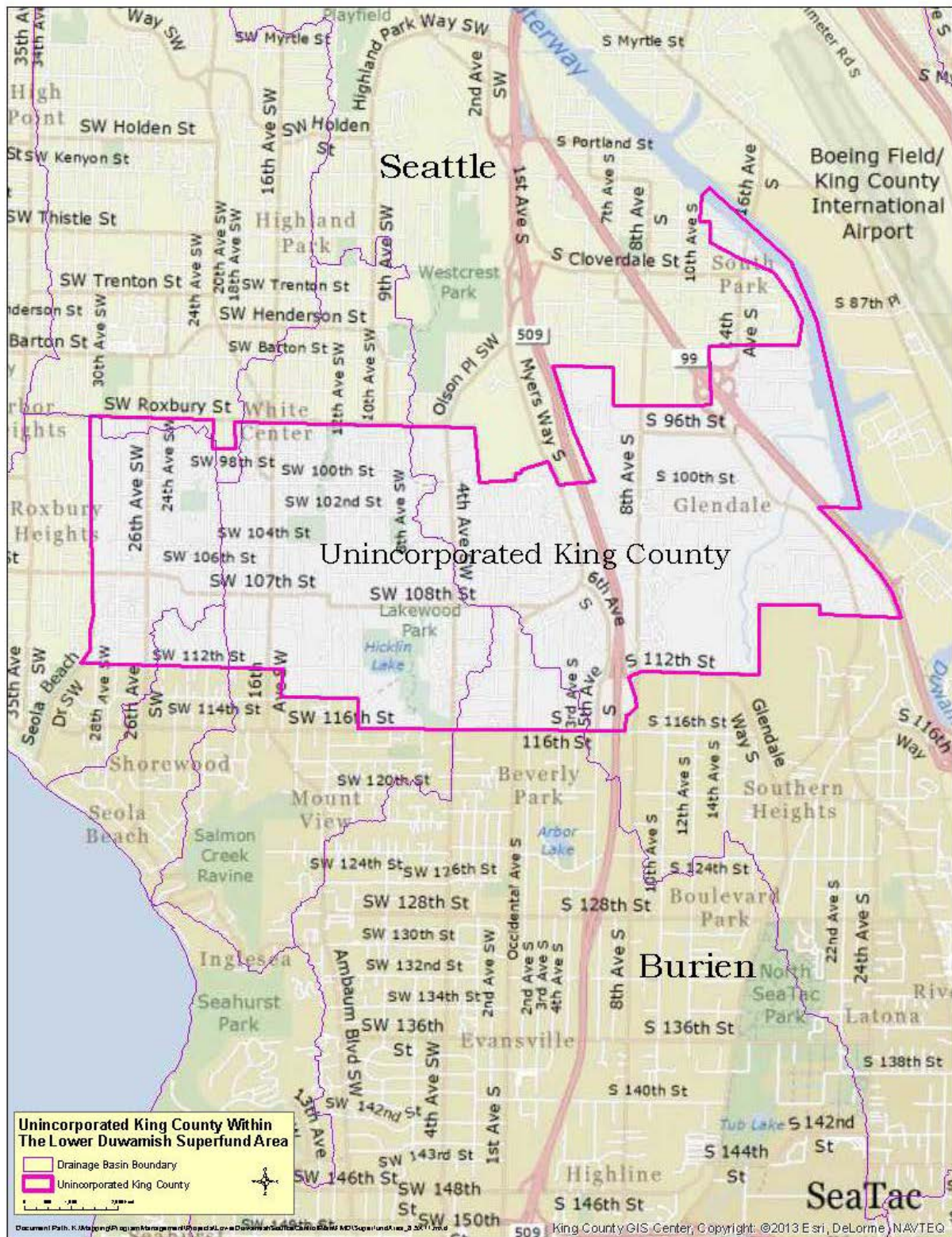
The South 96th Street Corridor has long been home to a number of industrial activities. While King County's source control program has an inspection rate of approximately once every five years, increasing the frequency presents the opportunity to more readily identify and control sources of pollutants that could lead to sediment recontamination.

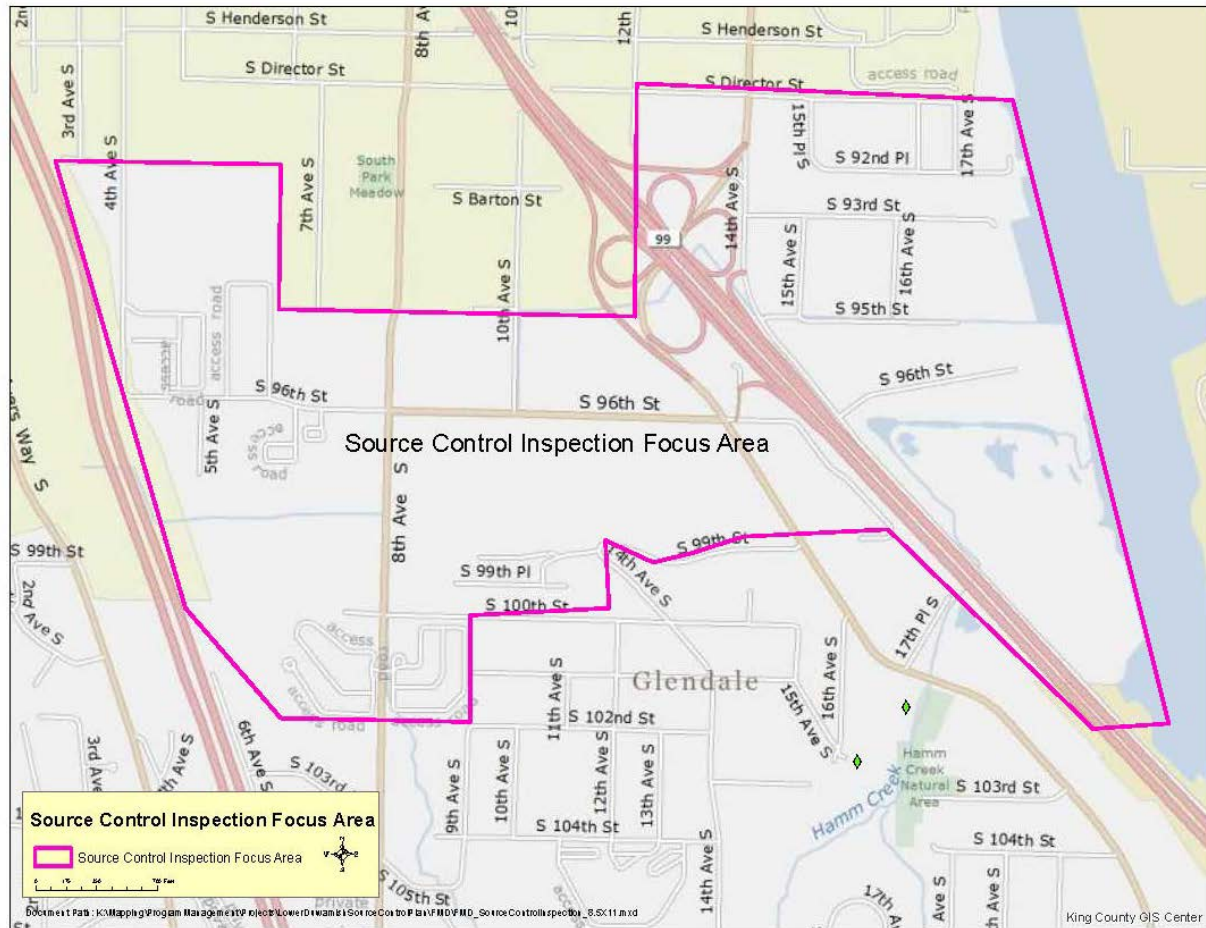
#### **Scope of Work**

Over the next five years, WLRD will increase the frequency of source control inspections to once every two to three years, depending on the nature of the business and potential to pollute.

It is anticipated that this effort will help to identify sources of COCs in stormwater. Another goal is to encourage and increase continued compliance among businesses in the corridor. The increase in oversight and technical assistance should result in the need for fewer corrective action letters and reduced potential of recontamination of stormwater. The presumption is that increasing the frequency of inspections of businesses that have a higher potential to pollute will reduce stormwater contamination and prevent new sources of contamination.

This effort also relies on the continued coordination with the City of Seattle and Ecology on inspections of properties that drain to the City's drainage system or operate under an Ecology NPDES permit. In addition, continuing to share source control activities and information in the LDW SCWG is an important component of this effort.





**Figure 3-4. Source Control Inspection Focus Area in the South 96th Street Corridor**



**Table 3-2. Summary of Water and Land Resources Division  
Additional and Accelerated Actions in 2014-2018**

Additional and Accelerated Actions	Completion Date
<b>Mapping</b> <ul style="list-style-type: none"> <li>• Launch King County MS4 database</li> <li>• Complete the MS4 legacy data migration of all available stormwater features into the central King County Stormwater Geodatabase for the LDW</li> <li>• Complete gap analyses for the MS4 mapping in the LDW</li> <li>• Complete mapping of the County's MS4 in the LDW</li> <li>• Complete commercial facility mapping of properties in the LDW, regulated by the County, for the MS4 mapping program</li> <li>• Submit progress reports on the MS4 mapping effort to Ecology</li> </ul>	<p>June 2014</p> <p>September 2014</p> <p>November 2014</p> <p>June 2015</p> <p>June 2015</p> <p>Annually, through the Municipal Stormwater NPDES annual report, until project is complete</p>
<b>Source Control Inspections in South 96th Street Corridor</b> <ul style="list-style-type: none"> <li>• Inventory parcels, businesses, and private drainage facilities in the South 96th Street Corridor; information will be gathered from the King County Assessor's database, aerial photographs, inspection records, and field reconnaissance</li> <li>• Develop inspection-prioritization matrix based on potential to pollute and consequences of pollution, considering the nature of the business (if known), potential pollutants, risk of recontamination of river sediment, and previous inspection results</li> <li>• Evaluate each business to determine inspection schedule</li> <li>• Develop inspection schedule</li> <li>• Conduct source control inspections that include identification of all activities that occur or could occur on-site and BMPs to minimize or prevent stormwater contamination; consider the conveyance system and possible illicit connections; address identified issues through a progressive enforcement scheme as outlined in the County's SWMP Plan<sup>a</sup></li> <li>• Include findings in Ecology's LDW Source Control Status Report</li> </ul>	<p>June 30, 2015</p> <p>September 30, 2015</p> <p>September 30, 2015</p> <p>End of 2015</p> <p>2016-2018</p> <p>Annually</p>

<sup>a</sup> The County's SWMP Plan is available at: <http://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/stormwater-management-program/2013-swmp-and-appendices.pdf>

### **3.3 King County International Airport Additional and Accelerated Actions in 2014-2018**

KCIA is one of the busiest primary non-hub airports in the nation. It serves small commercial passenger airlines, cargo carriers, private aircraft owners, helicopters, corporate jets, and military and other aircraft. It is also home to the Boeing Company's 737 aircraft flight-test program, along with other Boeing operations.

The airport is located at 7277 Perimeter Road South in Seattle. It is owned and operated by King County as a public utility and consists of 615 acres, where 435 acres is impervious surface covered by buildings and paved areas. The remaining 180 acres consist of grass and landscape areas. KCIA's primary pathway to the LDW is stormwater discharged through its drainage basin outfalls.

The additional and accelerated actions that KCIA intends to carry out to supplement its ongoing LDW source control efforts and commitments are annual sampling and source tracing in its drainage system in 2014-2018. These actions are described below, followed by a summary in Table 3-3.

#### **3.3.1 KCIA Sampling and Source Tracing**

There are approximately 15 miles of stormwater drainage pipe in the airport storm drainage system. Four stormwater outfalls discharge into the LDW; one to Slip 4, one to former Slip 5, one to Slip 6; and one to the Norfolk SD/CSO. Two pump stations lift the water and pump it to two of the outfalls (Slip 4 and former Slip 5), which drain the north and central basins of the airport, respectively. Two gravity lines drain the south central basin to Slip 6 and south basin to Norfolk SD/CSO (Figure 3-5).

Several off-site stormwater sources discharge into the airport drainage system. Public stormwater systems such as Airport Way and East Marginal Way discharge stormwater into the airport drainage system. Private stormwater systems such as the Museum of Flight property, Woodland Meadows property, and the International Auto Auction, Inc., property connect to the airport stormwater system for discharge to the LDW.

Airport activities are generally divided into airport and tenant activities. Air transportation activities, such as aircraft testing and painting, aircraft maintenance/storage, aircraft fueling, and aircraft de-icing and washing, are primarily performed by the tenants. Because of applicable industrial activities, each of six of the larger tenants at the airport has been issued an Industrial Stormwater General Permit (ISGP) that is administered by Ecology. KCIA tracks tenant compliance through tenant inspections. Remaining tenants adhere to the requirements of KCIA's ISGP, King County's MSGP, and all applicable local, state, and federal laws required in lease agreements. All airport and tenant activities have the potential to introduce pollutants into the stormwater system, such as fuels, oil, and greases, de-icing/anti-icing agents, suspended sediments, and other chemical contaminants into the stormwater. Corrective actions are implemented by either KCIA or responsible tenants as indicated by source investigations.



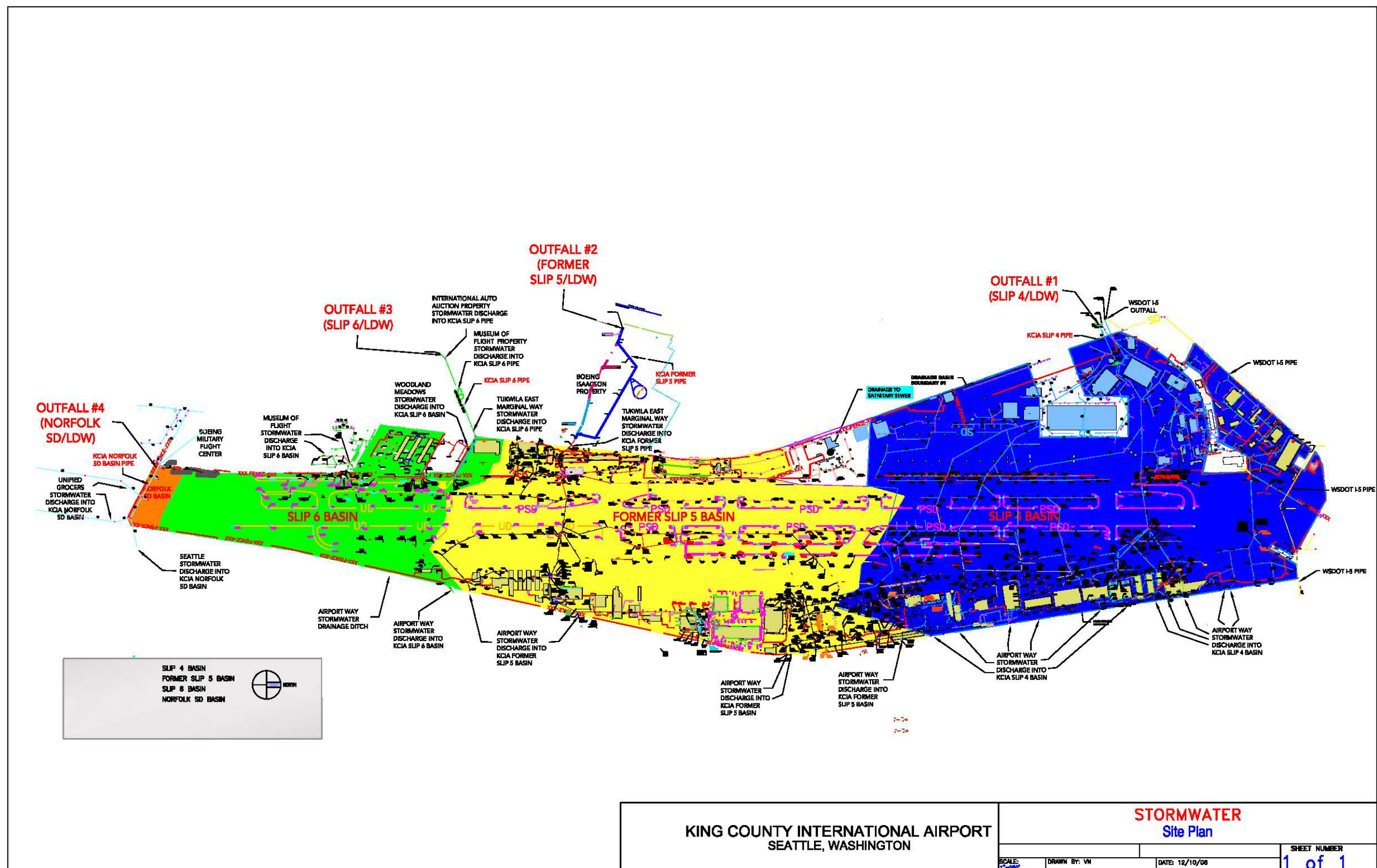


Figure 3-5. King County International Airport Stormwater Site Plan





## **Background**

In 2005, SPU installed in-line sediment traps at the KCIA Slip 4 basin to characterize stormwater solids that may pose a potential for sediment recontamination to Slip 4. Ten in-line sediment traps were installed and sampled semi-annually or annually through 2012. Traps were installed at up-gradient locations of North Boeing Field, a KCIA tenant, and at down-gradient locations of NBF. The annual sampling of these traps continues in accordance with the NBF state MTCA Agreed Order. Additional stormwater solids sampling at KCIA are planned for 2014. Source control activities will also be performed in accordance with requirements from Ecology under the order.

In 2008, with the assistance of SPU, KCIA initiated an effort to evaluate stormwater solids discharges from other KCIA drainage basins into the LDW. SPU installed in-line sediment traps at discharge points to the Slip 6, former Slip 5, and former Jorgensen Forge drainage basins at KCIA. SPU collected in-line sediment trap and in-line solids grab samples annually. In 2009, KCIA rerouted its Jorgensen Forge stormwater drainage into the former Slip 5 drainage basin. In 2012, SPU relinquished annual sampling activities to KCIA. In May 2013, KCIA conducted in-line sediment traps and in-line solids grab sampling at all drainage basins.

KCIA has collected in-line sediment trap and grab sampling data from 2009 to 2013 at its Slip 6 and former Slip 5 basins. KCIA is reviewing this and other available sampling data from Ecology and other agencies.

### **Slip 6 Basin**

Preliminary results for the Slip 6 basin show average total metals (arsenic, copper, lead, mercury, and zinc) and total PCB concentrations below sediment quality standards/low apparent effects threshold (SQS/LAET). Average phthalates and total high molecular weight PAH (HPAH) concentrations were above SQS/LAET levels. Recent data collected by KCIA in May 2013 showed metals, PCBs, low molecular weight PAH (LPAH), HPAH, and phthalates below SQS/LAET. Recent Ecology data collected in May 2013 reflected these findings, except for HPAH which was slightly above SQS/LAET. Overall, the trend of pollutant concentrations from KCIA is decreasing, which may be attributable to the effectiveness of source control activities.

Source tracing investigations are being performed at the two main laterals of the Slip 6 basin to determine potential KCIA sources. As discussed above, other off-site stormwater sources discharge into the KCIA Slip 6 basin and eventually into Slip 6 and LDW. KCIA has no control on the quantity and quality of these stormwater sources.

### **Former Slip 5 Basin**

At the former Slip 5 basin, data from in-line trap and grab sample data results show average total LPAH, HPAH, phthalate and PCB concentrations below SQS/LAET. Recent south pump station (SPS) data collected by KCIA in 2012 and Ecology in May 2013 reflected these findings. Overall, the trend of pollutant concentrations from KCIA is decreasing, which appears to be attributable to the effectiveness of source control activities and BMPs.

Zinc and arsenic concentrations were above SQS. These exceedances may be attributable to down-gradient off-site sources during tidal backflow conditions. In-line sediment traps and KCIA stormwater pipes are susceptible to backflow conditions because there is no backflow prevention from down-gradient off-site sources (LDW and East Marginal Way drainage). The KCIA SPS is not affected by these sources and more accurately represents the airport's pollutant

contribution to the LDW. Zinc and arsenic samples collected at the SPS in the last two years show concentrations below SQS/LAET.

#### **Scope of Work**

KCIA intends to continue in-line-sediment traps and grab sampling on an annual basis during 2014-2018 to evaluate: (1) effectiveness of source control activities and BMPs, (2) changes from airport/tenant industrial activities, and (3) pollutant contribution trends. The in-line sediment trap monitoring effort will assist in source tracing, identification, and control activities at the airport. KCIA will work with the appropriate regulatory authorities to resolve any issues resulting from this work.

Primary source control activities will continue, as described in Appendix B. These include tenant inspections, assessments, or corrective actions; BMP implementation; and reporting.

**Table 3-3. Summary of King County International Airport  
Additional and Accelerated Actions in 2014-2018**

<b>Additional and Accelerated Action</b>	<b>Completion Date</b>
<b>Sampling and Source Tracing</b>	
<ul style="list-style-type: none"> <li>Conduct annual in-line sediment traps sampling</li> </ul>	Annually through 2018
<ul style="list-style-type: none"> <li>Evaluate KCIA stormwater solids that may pose a potential for recontamination to LDW sediments</li> </ul>	Annually through 2018
<ul style="list-style-type: none"> <li>Provide information for Ecology's annual LDW Source Control Status Report</li> </ul>	Annually

### **3.4 Roads Services Division Additional and Accelerated Actions in 2014-2018**

RSD designs, builds, operates, and maintains roads, bridges, and other features in ROW in unincorporated areas of King County. The RSD service area includes roadways and bridges in about 11 percent of the LDW drainage basin. RSD also has some responsibility for maintaining the County's MS4 under the County's Municipal Stormwater NPDES permit. Responsibilities include street sweeping and vactoring, repairing, and cleaning stormwater flow control and water quality treatment facilities, catch basins, and conveyance systems (pipes and ditches). These efforts help prevent sediments and associated contaminants and petroleum hydrocarbons, PAHs, and metals from entering the LDW.

RSD has faced significant funding challenges in recent years. In 2014, RSD will use a portion of its limited funds to support drainage work on an as-needed basis to address drainage system problems or failures as they emerge. RSD is also partnering with WLRD in 2014 to seek funding from National Estuary Program (NEP) grants that are offered each biennium to clean pipes of legacy contaminants. Legacy contaminants can adhere to the stormwater pipes and sediments in the drainage system. Periodic cleaning will prevent these contaminants from entering rivers, lakes, and Puget Sound. In 2015-2018, WLRD will contribute \$500,000 over five years (subject to King County Council budget approval) to clean pipes and perform land stability actions associated with legacy contaminants along the South 96th Street corridor. These funds would be used in unincorporated areas only.

Additional funding will be sought through other sources, such as grants, to supplement this effort.

### **3.5 Development of a 20-Year Source Control Implementation Plan**

The county agencies involved in source control work will coordinate to discuss future LDW source control efforts to be implemented in 2019-2028. It is important to note that many of the County's current source control practices, such as projects to control CSOs, already have projects planned in that time frame. Information on these efforts is detailed in Appendix B.

#### **3.5.1 Scope of Work**

In 2014-2018, the County will develop a strategy for coordinating and delivering a 20-year LDW source control plan to Ecology. The County intends to submit its 20-year plan by December 31, 2017.

### **3.6 Reporting**

The county agencies involved in carrying out the LDW source control additional and accelerated actions intend to provide a report to Ecology by the end of March 2019 that summarizes the progress and effectiveness of action implementation. The report will be made available to the public through the County's "Our Duwamish" website.<sup>9</sup>

In addition to established reporting mechanisms that are in place through existing permits or other requirements and agreements between Ecology and the County, ongoing progress reports regarding the County's planned source control action items will be submitted through Ecology's Lower Duwamish annual Source Control Status Report.<sup>10</sup>

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<sup>9</sup> King County's "Our Duwamish" website is available at <http://www.kingcounty.gov/environment/watersheds/green-river/OurDuwamish.aspx>.

<sup>10</sup> Ecology's annual Source Control Status Reports are available at [http://www.ecy.wa.gov/programs/tcp/sites\\_brochure/lower\\_duwamish/source\\_control/sc.html](http://www.ecy.wa.gov/programs/tcp/sites_brochure/lower_duwamish/source_control/sc.html).



## 4.0 Continuing Coordination

The actions described in Chapter 3 cannot be done in a vacuum. Achievements in source control have been and continue to be a collaborative effort among King County divisions, the City of Seattle, Ecology, and other agencies involved in the LDWG and the LDW SCWG.

### 4.1 External Coordination

Over the next five years and beyond, the County intends to continue to actively participate in a collaborative manner with regional partners and governmental agencies. Examples of existing efforts anticipated to continue are as follows:

- Conducting joint inspections, referrals, and investigations with the City of Seattle, Ecology, and EPA
- Coordinating with Ecology and LDWG partners on LDW Source Control Strategy and Action Plans
- Participating in the LDW SCWG or its successor
- Coordinating annual work plans as part of the LDW SCWG
- Coordinating with the City of Seattle on source tracing in combined sewer areas
- Coordinating source control inspections in the LDW as part of the Urban Waters Initiative<sup>11</sup>
- Working with City of Seattle on developing a Joint Operations and System Optimization Plan to improve the functioning of the combined sewer system
- Working with the cities of Seattle, Tukwila, Kent, and Auburn to implement Phase I stormwater permits
- Facilitating regional discussions on operations and maintenance issues of stormwater infrastructure as part of the Regional Operations and Maintenance Program
- Working with Central Sound Permit Coordinators Phase I and Phase II MS4 NPDES Municipal Stormwater Permit holders
- Participating in regional and national forums to promote product stewardship
- Coordinating Interagency Resource for Achieving Cooperation and Interagency Compliance Team activities focused on regional issues
- Participating in the Management Coordination Committee to improve local hazardous waste programs
- Participating on the Advisory Council of the Puget Sound Clean Air Agency (PSCAA)
- Coordinating activities with the City of Seattle, Port of Seattle, Boeing, and other potentially responsible parties through existing agreements

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<sup>11</sup> The Urban Waters Initiative is an interagency coordination effort of Ecology that provides increased resources to speed up pollution reduction efforts to benefit the waters, the sediments, and human and marine inhabitants of the LDW.

## **4.2 Internal Coordination**

In addition to regional efforts, the County will focus on enhancing cross-county agency coordination and communication efforts over the next five years. In the past year, a team of representatives from the four primary county divisions involved in source control (WTD, WLRD, KCIA, and RSD), as well as representatives from the FMD, SWD, Public Health, and LHWMP in King County has been meeting routinely to coordinate the 2014 - 2018 implementation plan. The County intends to continue to employ a cross-divisional team to coordinate source control efforts and enhance communication and is working to formalize a method for ongoing coordination across departments. The County will include its strategy for internal coordination in its 20-year source control plan for the LDW.

## Appendix A

### List of Potential Contaminants of Concern Included in the Lower Duwamish Waterway Final Feasibility Study

Section 3 – Risk Assessment Summary

Table 3-1 Summary of COCs and Selection of Risk Drivers for Benthic Invertebrates

COPC	SMS Criteria			No. of Detected Concentrations in Surface Sediments		Benthic COC?	Benthic Risk Driver?	Rationale for Selection/Exclusion as Risk Driver
	Unit	SQS	CSL	> SQS, < CSL	> CSL			
Metals (mg/kg dw)								
Arsenic	mg/kg dw	57	93	5	8	Yes	Yes	Detected concentration(s) > SQS
Cadmium	mg/kg dw	5.1	6.7	2	11	Yes	Yes	Detected concentration(s) > SQS
Chromium	mg/kg dw	260	270	1	8	Yes	Yes	Detected concentration(s) > SQS
Copper	mg/kg dw	390	390	0	12	Yes	Yes	Detected concentration(s) > SQS
Lead	mg/kg dw	450	530	2	19	Yes	Yes	Detected concentration(s) > SQS
Mercury	mg/kg dw	0.41	0.59	14	23	Yes	Yes	Detected concentration(s) > SQS
Nickel <sup>a</sup>	n/a	n/a	n/a	9 (DMMP SL)	4 (DMMP ML)	Yes	No	Moderate TRV uncertainty; areas with concentrations greater than the TRV were all in planned sediment remediation areas
Silver	mg/kg dw	6.1	6.1	0	10	Yes	Yes	Detected concentration(s) > SQS
Zinc	mg/kg dw	410	960	26	16	Yes	Yes	Detected concentration(s) > SQS
PAHs (mg/kg oc)								
2-Methylnaphthalene	mg/kg oc	38	64	0	3	Yes	Yes	Detected concentration(s) > SQS
Acenaphthene	mg/kg oc	16	57	16	3	Yes	Yes	Detected concentration(s) > SQS
Acenaphthylene	mg/kg oc	66	66	0	0	No	No	No detected concentration(s) > SQS
Anthracene	mg/kg oc	220	1,200	2	0	Yes	Yes	Detected concentration(s) > SQS
Benzo(a)anthracene	mg/kg oc	110	270	9	3	Yes	Yes	Detected concentration(s) > SQS
Benzo(a)pyrene	mg/kg oc	99	210	5	3	Yes	Yes	Detected concentration(s) > SQS
Benzo(g,h,i)perylene	mg/kg oc	31	78	9	7	Yes	Yes	Detected concentration(s) > SQS
Total benzofluoranthenes	mg/kg oc	230	450	5	4	Yes	Yes	Detected concentration(s) > SQS
Chrysene	mg/kg oc	110	460	23	1	Yes	Yes	Detected concentration(s) > SQS
Dibenzo(a,h) anthracene	mg/kg oc	12	33	15	4	Yes	Yes	Detected concentration(s) > SQS
Dibenzofuran	mg/kg oc	15	58	7	3	Yes	Yes	Detected concentration(s) > SQS

Table 3-1 Summary of COCs and Selection of Risk Drivers for Benthic Invertebrates (continued)

COPC	SMS Criteria			No. of Detected Concentrations in Surface Sediments		Benthic COC?	Benthic Risk Driver?	Rationale for Selection/Exclusion as Risk Driver
	Unit	SQS	CSL	> SQS, < CSL	> CSL			
Fluoranthene	mg/kg oc	160	1,200	31	8	Yes	Yes	Detected concentration(s) > SQS
Fluorene	mg/kg oc	23	79	11	3	Yes	Yes	Detected concentration(s) > SQS
Indeno(1,2,3-cd) pyrene	mg/kg oc	34	88	15	8	Yes	Yes	Detected concentration(s) > SQS
Naphthalene	mg/kg oc	99	170	0	2	Yes	Yes	Detected concentration(s) > SQS
Phenanthrene	mg/kg oc	100	480	24	3	Yes	Yes	Detected concentration(s) > SQS
Pyrene	mg/kg oc	1,000	1,400	1	3	Yes	Yes	Detected concentration(s) > SQS
Total HPAH	mg/kg oc	960	5,300	21	3	Yes	Yes	Detected concentration(s) > SQS
Total LPAH	mg/kg oc	370	780	3	3	Yes	Yes	Detected concentration(s) > SQS
<b>Phthalates (mg/kg oc)</b>								
Bis(2-ethylhexyl) phthalate	mg/kg oc	47	78	48	58	Yes	Yes	Detected concentration(s) > SQS
Butyl benzyl phthalate	mg/kg oc	4.9	64	69	8	Yes	Yes	Detected concentration(s) > SQS
Diethyl phthalate	mg/kg oc	61	110	0	0	No	No	No detected concentration(s) > SQS
Dimethyl phthalate	mg/kg oc	53	53	0	2	Yes	Yes	Detected concentration(s) > SQS
Di-n-butyl phthalate	mg/kg oc	220	1,700	0	0	No	No	No detected concentration(s) > SQS
Di-n-octyl phthalate	mg/kg oc	58	4,500	0	0	No	No	No detected concentration(s) > SQS
<b>Other SVOCs (mg/kg oc)</b>								
1,2,4-Trichlorobenzene	mg/kg oc	0.81	1.8	0	1	Yes	Yes	Detected concentration(s) > SQS
1,2-Dichlorobenzene	mg/kg oc	2.3	2.3	0	3	Yes	Yes	Detected concentration(s) > SQS
1,4-Dichlorobenzene	mg/kg oc	3.1	9	0	3	Yes	Yes	Detected concentration(s) > SQS
2,4-Dimethylphenol	µg/kg dw	29	29	0	1	Yes	Yes	Detected concentration(s) > SQS
2-Methylphenol	µg/kg dw	63	63	0	0	No	No	No detected concentration(s) > SQS
4-Methylphenol	µg/kg dw	670	670	0	4	Yes	Yes	Detected concentration(s) > SQS
Benzoic acid	µg/kg dw	650	650	0	7	Yes	Yes	Detected concentration(s) > SQS





Table 3-1 Summary of COCs and Selection of Risk Drivers for Benthic Invertebrates (continued)

COC	SMS Criteria			No. of Detected Concentrations in Surface Sediments		Benthic COC?	Benthic Risk Driver?	Rationale for Selection/Exclusion as Risk Driver
	Unit	SQS	CSL	> SQS, < CSL	> CSL			
Benzyl alcohol	µg/kg dw	57	73	2	2	Yes	Yes	Detected concentration(s) > SQS
Hexachlorobenzene	mg/kg oc	0.38	2.3	4	2	Yes	Yes	Detected concentration(s) > SQS
Hexachlorobutadiene	mg/kg oc	3.9	6.2	0	0	No	No	No detected concentration(s) > SQS
n-Nitrosodiphenylamine	mg/kg oc	11	11	0	2	Yes	Yes	Detected concentration(s) > SQS
Pentachlorophenol	µg/kg dw	360	690	1	0	Yes	Yes	Detected concentration(s) > SQS
Phenol	µg/kg dw	420	1,200	18	7	Yes	Yes	Detected concentration(s) > SQS
<b>PCBs (mg/kg oc)</b>								
Total PCBs	mg/kg oc	12	65	301	173	Yes	Yes	Detected concentration(s) > SQS
<b>Pesticides</b>								
Total DDTs <sup>a</sup>	n/a	n/a	n/a	1 (NOAEL)	1 (LOAEL)	Yes	No	Moderate TRV uncertainty; the 1 sample with a concentration greater than the TRV is in a planned sediment remediation area
Total chlordane <sup>a</sup>	n/a	n/a	n/a	19 (NOAEL)	14 (LOAEL)	Yes	No	High uncertainty in exposure data and TRV; 13 of 14 samples with LOAEL exceedances were in planned sediment remediation areas

## Notes:

1. This table is derived from Table 5-6 of the RI (Windward 2010).

2. Statistics in this table were calculated using the RI baseline dataset.

a. No SMS numerical criteria were available for these contaminants. Thus, the comparison is with the DMMP SL and ML for nickel or with the NOAEL or LOAEL for total DDTs and total chlordane. COC = contaminant of concern; CSL = cleanup screening level of SMS; DDT = dichlorodiphenyltrichloroethane; DMMP = Dredged Material Management Program; HPAH = high-molecular-weight polycyclic aromatic hydrocarbon; HQ = hazard quotient; LOAEL = lowest-observed-adverse-effect level; LPAH = low-molecular-weight polycyclic aromatic hydrocarbon; mg/kg oc = milligrams per kilogram organic carbon; ML = maximum level; n/a = not applicable; NOAEL = no-observed-adverse-effect level; oc = organic carbon; PAH = polycyclic aromatic hydrocarbon; PCB = polychlorinated biphenyl; RI = remedial investigation; SL = screening level; SMS = Washington State Sediment Management Standards; SQS = sediment quality standard of SMS; SVOC = semivolatile organic compound; TRV = toxicity reference value



**Table 3-2 Summary of COCs and Selection of Risk Drivers for Crab, Fish, and Wildlife Species**

COC <sup>a</sup>	Receptor of Concern	NOAEL-based HQ	LOAEL-based HQ	Risk Driver?	Rationale for Selection or Exclusion as Risk Driver
Total PCBs	Crabs	10	1.0	No	Low risk estimate (LOAEL HQ equal to 1.0) and high level of uncertainty associated with TRV and exposure data.
	English Sole	4.9 – 25	0.98 – 5.0	No	Exposure concentrations were within the LOAEL range. A LOAEL range was used because of the high level of uncertainty associated with the TRV.
	Pacific Staghorn Sculpin	1.5 – 19	0.30 – 3.8	No	
	River Otter	5.8	2.9	Yes	LOAEL-based HQ for river otter was greater than 1.0 (HQ of 2.9), and the uncertainties associated with the exposure and effects data were relatively low.
Total PCBs and PCB TEQ	Spotted Sandpiper	1.9 – 15	0.18 – 1.5	No	LOAEL-based HQs for total PCBs were less than 1.0, but equal to 1.5 for PCB TEQ. The effects data used to calculate risk estimates for total PCBs were less uncertain than those for PCB TEQ.
Cadmium	Juvenile Chinook Salmon	5.0	1.0	No	High level of uncertainty associated with the selected TRV and low risk estimates.
	English Sole	6.1	1.2	No	
	Pacific Staghorn Sculpin	3.0 – 5.2	0.60 – 1.0	No	
Chromium	Spotted Sandpiper	1.3 – 8.8	0.26 – 1.8	No	Elevated risks were driven by a single benthic invertebrate tissue sample (and co-located sediment was not elevated).
Copper	Spotted Sandpiper	0.62 – 1.5	0.45 – 1.1	No	Sediment concentrations were similar to PSAMP rural Puget Sound concentrations, and HQs will be less than 1 following planned sediment remediation in EAAs.
Lead	Spotted Sandpiper	0.58 – 19	0.17 – 5.5	No	Elevated risks were driven by a single benthic invertebrate tissue sample (and co-located sediment was not elevated).
Mercury	Spotted Sandpiper	1.1 – 5.3	0.21 – 1.0	No	HQs will be less than 1 following planned sediment remediation in EAAs.
Vanadium	English Sole	5.9	1.2	No	High uncertainty in effects data (few toxicity studies), and sediment concentrations of vanadium in exposure areas were less than the 90 <sup>th</sup> percentile vanadium concentration in PSAMP rural Puget Sound sediment.
	Pacific Staghorn Sculpin	3.2 – 5.9	0.65 – 1.2	No	
	Spotted Sandpiper	2.0 – 2.7	1.0 – 1.4	No	

## Notes:

- This table is derived from Table 5-16 of the RI (Windward 2010).
- HQs for fish are highest when more than one approach was used.
- Bold** identifies NOAEL-based HQs greater than 1.0 or LOAEL-based HQs greater than or equal to 1.0.
  - A contaminant was identified as a COC if the LOAEL-based HQ was greater than or equal to 1.0.

COC = contaminant of concern; EAA = early action area; HQ = hazard quotient; LOAEL = lowest-observed-adverse-effect level; NOAEL = no-observed-adverse-effect level; PCB = polychlorinated biphenyl; PSAMP = Puget Sound Ambient Monitoring Program; RI = remedial investigation; TEQ = toxic equivalent; TRV = toxicity reference value



**Table 3-3 Summary of COCs for Human Health Seafood Consumption and Direct-Contact Sediment Exposure Scenarios**

COC <sup>a</sup>	Human Health Exposure Pathway	
	Seafood Consumption	Direct Contact
Total PCBs <sup>b</sup>	X	X
Arsenic	X	X
cPAHs	X	X
Dioxins/furans	X	X
Aldrin <sup>c</sup>	X	
BEHP	X	
Alpha-BHC <sup>c</sup>	X	
Beta-BHC <sup>c</sup>	X	
Carbazole <sup>c</sup>	X	
Total chlordane <sup>c</sup>	X	
Total DDTs <sup>c</sup>	X	
Dieldrin <sup>c</sup>	X	
Gamma-BHC <sup>c</sup>	X	
Heptachlor <sup>c</sup>	X	
Heptachlor epoxide <sup>c</sup>	X	
Hexachlorobenzene <sup>c</sup>	X	
Pentachlorophenol	X	
TBT	X	
Toxaphene <sup>c</sup>		X
Vanadium	X	

**Notes:**

- Contaminants with an excess cancer risk greater than  $1 \times 10^{-6}$  or a non-cancer HQ greater than 1 for at least one RME seafood consumption scenario were identified as COCs.
- PCB TEQ was also identified as having risks greater than  $1 \times 10^{-6}$  for at least one RME seafood consumption scenario and at least one RME direct contact scenario.
- These contaminants were qualified as tentatively identified compounds at estimated concentrations (JN-qualified), indicating uncertainty regarding both their presence and concentration.

BEHP = bis(2-ethylhexyl) phthalate; BHC = benzene hexachloride; COC = contaminant of concern; cPAH = carcinogenic polycyclic aromatic hydrocarbon; DDT = dichlorodiphenyltrichloroethane; HQ = hazard quotient; PCB = polychlorinated biphenyl; RME = reasonable maximum exposure; TBT = tributyltin; TEQ = toxic equivalent





## **Appendix B**

### **King County's Ongoing Source Control Commitments in the Lower Duwamish Waterway**

This appendix details the ongoing source control efforts that are part of King County's regulatory requirements and long-term commitments described in Chapter 2. The actions described in Chapter 3 serve to supplement the ongoing source control efforts and commitments that several King County divisions and a multi-jurisdictional program carry out. Implementation of the actions will ensure that the County's ongoing and planned LDW source control efforts are as effective as possible and meet or exceed permit requirements and other commitments.

The following sections describe LDW source control efforts of the following county divisions: WTD, WLRD, SWD, KCIA, RSD, FMD of the Department of Executive Services, and Environmental Health Services Division of Public Health. The work of the LHWMP, a multi-jurisdictional program that focuses on reducing public and environmental exposure to hazardous materials, is also described.

#### **Wastewater Treatment Division**

WTD protects water and sediment quality in the LDW through the actions listed below and described further in this section:

- Implementing the County's CSO Control Program (known as Protecting Our Waters)
- Complying with NPDES permits that regulate WTD wastewater treatment plants
- Carrying out the county Industrial Pretreatment Program
- Implementing the county Sediment Management Program
- Inspecting and maintaining WTD facilities
- Providing educational and public outreach activities
- Participating in the RainWise Program
- Funding the LDW Green Grants Program

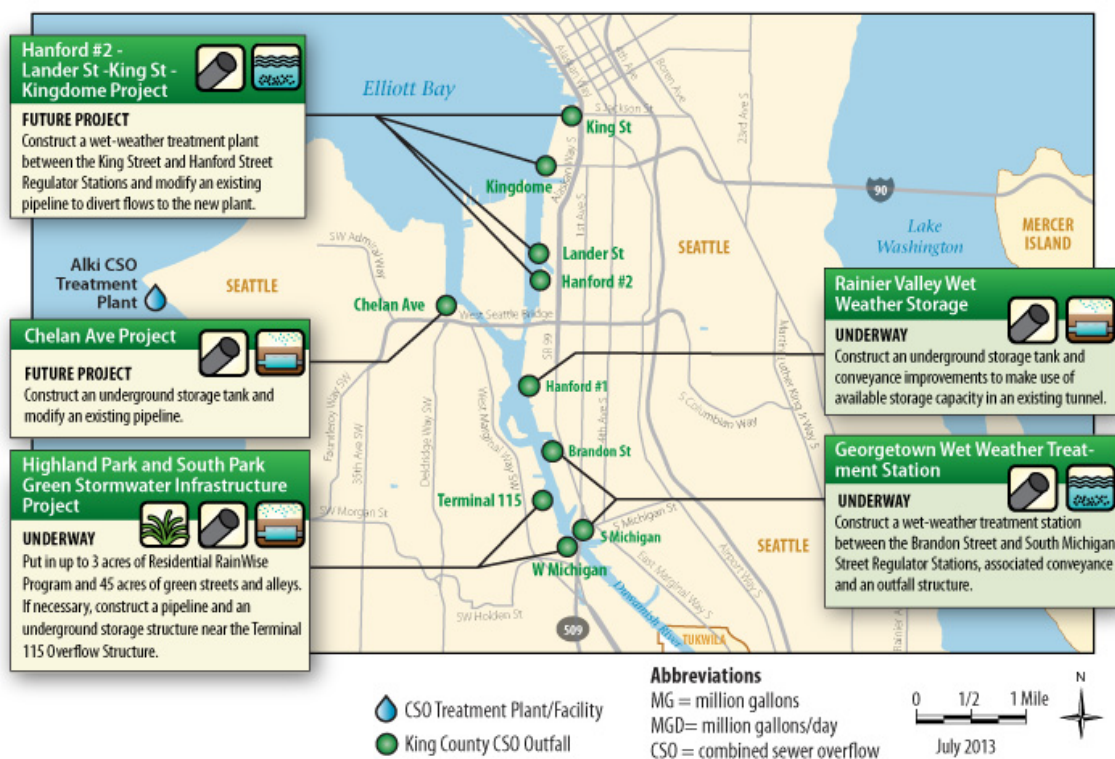
WTD is also responsible for some of the actions described in Chapter 3.

More information on WTD's programs is available at:  
<http://www.kingcounty.gov/environment/wtd.aspx>.

#### **Protecting Our Waters Program, WTD's Combined Sewer Overflow Control Program**

WTD has been implementing the County's CSO Control Program, Protecting Our Waters, since the late 1970s. King County has spent \$389 million on CSO control to date. The regional wastewater system includes CSO "relief points" in the combined sewer area of Seattle to prevent backups in homes and streets from extreme variations in stormwater volumes. These include 38 locations in the county system and about 90 in the SPU system. Half of the County's 38 CSOs have completed projects to be controlled to the Washington State standard of no more than one untreated CSO discharge per year on a 20-year average. In 2012, the King County Council approved an amendment to WTD's long-term CSO control plan, approving nine projects to control the remaining 14 uncontrolled CSOs (Figure B-1) at a total project cost of \$710 million

(2010 dollars; predicted to be over \$1 billion of future funds spent by completion). Current CSO control projects in construction add another \$179 million (2010 dollars). This amended plan prioritizes the control of LDW CSOs ahead of the others to support the Superfund cleanup efforts. CSO control will decrease untreated CSO volume by 117 MGY and pollutant loadings in the LDW by approximately 60 percent.



**Figure B-1. Projects in WTD's Long-Term CSO Control Plan**

Control of all the County's CSOs by the end of 2030, including the projects approved by the County Council, is included in the consent decree that was signed in 2013 by the County, Ecology, EPA, and the U.S. Department of Justice. The schedule to complete these projects is in Appendix C. Three of the nine projects will control the five uncontrolled CSOs located in the LDW-Rainier Valley Wet Weather Storage project (controlling Hanford #1 CSO) and Georgetown Wet Weather Treatment Station (controlling Brandon and South Michigan CSOs) are now under way, and the West Michigan/Terminal 115 project is being evaluated for the feasibility of using GSI to provide early overflow reduction.

In regard to total loading of solids to the LDW, upstream sediment dominates the input of contaminants into the waterway. The solids inputs from the Green River, stormwater, and CSOs reported in these studies are shown in Table B-1 and compared to estimated inputs after CSO control.<sup>1</sup>

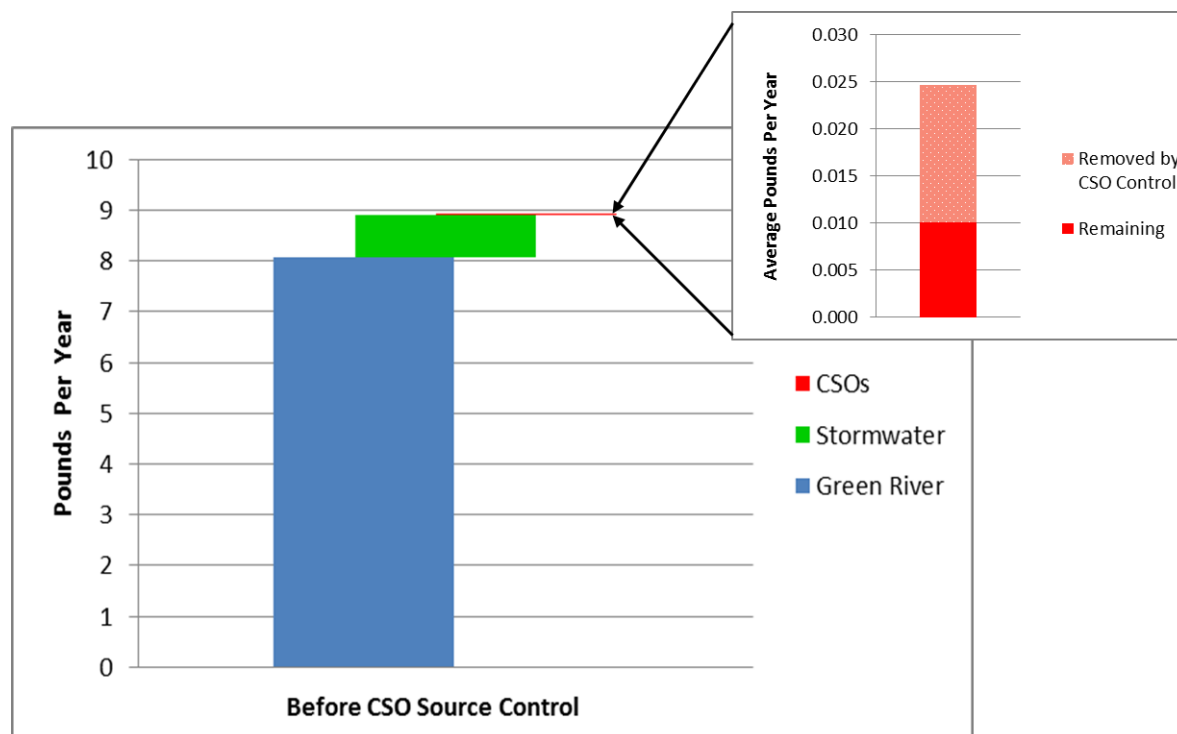
<sup>1</sup> Estimates of solids inputs are from the LDW Feasibility Study, which can be found at <http://yosemite.epa.gov/R10/CLEANUP.NSF/LDW/Lower+Duwamish+Waterway+Superfund+Site+Technical+Documents#FS>.

To provide context for CSO control in the LDW, the loading of solids and the concentrations of these solids were compared to estimate average inputs of PCBs from CSOs, stormwater, and the Green River (Figure B-2).<sup>2</sup> PCB sources to the LDW are dominated by upstream sources before CSO controls are installed. When completed and online, the CSO projects in the LDW are predicted to prevent approximately 0.14 pound of PCBs per year from entering the LDW, representing a 60 percent reduction in PCB input from the County's CSOs.

**Table B-1. Pre- and Post-CSO Control Annual Average Solids Inputs to the Lower Duwamish Waterway**

Source	Sediment Pre-CSO Control (MT/Y)	Sediment Post-CSO Control (MT/Y)
Stormwater	1,224	1,224 <sup>a</sup>
CSOs	35.5	14.9
Green River	101,600	101,600

<sup>a</sup> Stormwater reductions resulting from source control efforts have not been estimated.



**Figure B-2. Estimated Relative PCB Inputs to the Lower Duwamish Waterway**

<sup>2</sup> Assumes that CSOs and stormwater have similar concentrations of chemicals adsorbed to their sediments (315 parts per billion [ppb] dry weight) and that Green River sediment concentrations average 36 ppb dry weight, which is consistent with best estimate concentrations used in the LDW Feasibility Study (Table 5-2a) as inputs for model predictions. The executive summary for the Feasibility Study can be found at: [http://www.epa.gov/region10/pdf/sites/ldw/fs13/final\\_fs\\_executive\\_summary\\_103112.pdf](http://www.epa.gov/region10/pdf/sites/ldw/fs13/final_fs_executive_summary_103112.pdf).



Activities associated with the County's long-term CSO control plan in the 2014-2018 time frame and designed to significantly reduce pollutant loadings in the LDW include the following (in 2010 dollars):

- **Rainier Valley Wet Weather Storage (Hanford #1) CSO control project, \$19 M.** The Hanford #1 CSO currently overflows into the Duwamish River via the Diagonal storm drain a few times a year during storms. This project will remove 100,000 gallons per year of CSO discharges from the LDW and send the wastewater to West Point for treatment. The project is in design, will begin construction by the end of 2016, and will be completed by the end of 2019. It has been coordinated with Seattle's upstream Genesee CSO control project, which will capture SPU CSOs into Lake Washington and convey them with Hanford #1 flows for treatment at the County's future Hanford/Lander/King/Kingdom CSO control project.
- **Georgetown Wet Weather Treatment Station (Brandon/South Michigan) CSO control project, \$140 M.** This project is in predesign and includes the construction of a CSO wet weather treatment facility between the Brandon Street and South Michigan Street regulator stations, related conveyance pipeline, and a new outfall structure to release the treated water into the Duwamish Waterway. The facility will be able to treat up to 66 million gallons of combined rain and wastewater a day and average 102 MGY that would otherwise have discharged directly to the Duwamish without treatment during large storm events. The facility plan will be submitted to Ecology and EPA by the end of 2015. Construction is expected to begin by the end of 2017 and be completed by the end of 2022.
- **Chelan Avenue CSO control project, \$52 M.** This project will begin problem definition in 2015, and project predesign will begin in 2017. The project includes constructing an UST and modifying an existing pipeline to control the Chelan Avenue CSO and will remove 13 MGY from the LDW and send to West Point for treatment. Construction will be completed by the end of 2023. Coordination with Seattle's upstream Delridge CSO control project is under way.
- **West Michigan and Terminal 115 CSO control project, \$15 M.** GSI opportunities are being evaluated in 2014 for early CSO control. Groundwater monitoring wells have been installed in portions of the project area to determine GSI design options. In addition, rain garden rebates, through the joint City of Seattle and King County RainWise program, are available to property owners in the project area through 2015. These early actions will help determine the need and size of a storage pipe, which would be constructed by the end of 2025. In total, the project will remove 1.5 MGY of CSO discharges from the LDW, with some stormwater recharging groundwater and the rest treated at West Point.
- **CSO treatment of Seattle's Henderson area CSOs, no net cost with reimbursement.** King County has agreed to allow Seattle to convey 34 MGY of captured CSOs from the city's upstream Henderson area to the County's existing Henderson Pump Station and Henderson/MLK CSO storage and treatment facilities. Seattle's flows will be directed to WTD's South Plant for treatment with the highest flows stored in the Henderson Tunnel. If the storage capacity of the tunnel is exceeded, excess flows are treated that would otherwise have discharged directly to the Duwamish without treatment.



- **Water Quality Assessment and Monitoring Study, \$3 M.** County Ordinance 17413, which approved the amendment to the long-term CSO control plan, called for the County Executive to conduct a water quality assessment and monitoring study (assessment) to optimize water quality improvements in the sub-basins where CSOs discharge. This assessment will update the work done for the 1998 water quality assessment of the Duwamish River and Elliott Bay.

The purpose of the current assessment is to provide information on how CSO control can best work in conjunction with other water quality projects, to evaluate the effectiveness of emerging technologies, and to build a foundation for conducting post-construction monitoring of CSO control projects. It will also help in deciding whether to pursue an integrated CSO control plan under the consent decree, which may allow sequencing of CSO projects with other water quality improvement projects to obtain the greatest benefit as early as possible.

The assessment is under way and includes reviewing and analyzing the large amount of existing scientific and technical data on impairments in receiving waters where county CSOs discharge (the Lake Washington Ship Canal, Duwamish River, and Elliot Bay); identifying and filling data gaps; assessing the sources of impairments; and reviewing planned and potential corrective actions. In 2016, recommendations are expected on the sequencing and integration of CSO control projects and other corrective actions, and the information may influence the next CSO control program amendment, scheduled for 2018. In addition, the assessment will add to the understanding of the LDW and inform other water quality decisions.

- **GSI evaluations, \$0.2 M.** Evaluation of the potential to implement GSI in the South Park and Highland Park areas for early CSO reduction and eventual reduction by 0.2 MG of the storage tank needed to control the West Michigan and Terminal 115 CSOs is expected to be complete by December 2014.
- **CSO Control Program review, \$1 M.** The next CSO Control Program review and submittal of an updated long-term CSO control plan to Ecology and EPA are scheduled to be completed by June 2018.
- **Coordination with City of Seattle, \$0.6 M.** The County and Seattle are developing a Joint Operations and System Optimization Plan that must be submitted to EPA and Ecology no later than March 1, 2016, to meet consent decree requirements. Because Seattle's combined system is directly linked with the County's system, the County needs to maintain control of its LDW CSOs as the City controls its LDW CSOs. Therefore, ongoing coordination on CSO control efforts is a high priority for both agencies.

Once a CSO control project is constructed, the County implements post-construction monitoring. The purpose of the monitoring is to verify the effectiveness of CSO controls and demonstrate compliance with water quality standards and protection of designated uses and sensitive areas.

More information on the County's Protecting Our Waters Program is available at:  
<http://www.kingcounty.gov/environment/wastewater/CSO.aspx>.

## **Permit Compliance**

WTD complies with its NPDES permit for West Point. The permit includes discharge, loading, reporting, and monitoring requirements for all the facilities and outfalls associated with West Point, including CSO outfalls that discharge to the Duwamish River. Many actions required under the permit contribute to source control, in particular implementing the nine minimum controls for CSOs.

The NPDES permit also includes implementation of the Industrial Pretreatment Program. The KCIW carries out this program, which is an important component of WTD's LDW source control efforts, particularly prior to completion of the WTD's LDW CSO control projects.

More information on the NPDES permits for WTD's facilities is available at:  
<http://www.kingcounty.gov/environment/wtd/About/System/NPDES.aspx>.

## **King County Industrial Waste Program**

KCIW regulates industrial wastewater discharged into the King County wastewater system from industrial facilities to protect surface water and biosolids quality, the environment, public health, and the wastewater system. The program ensures that industrial facilities either treat wastewater to reduce harmful substances or use BMPs before discharging the wastewater to the sanitary sewers.

KCIW regulates approximately 180 facilities in the LDW, which represents approximately 25 percent of all the facilities regulated by the program.

The program ensures that discharges meet all applicable discharge limits and minimize volume of wastewater entering the sanitary system. The program requires sampling and conducts its own sampling annually to monitor industrial users. The frequency is site-specific and depends on the discharge volume, characteristics of the discharge, potential risk to the health of utility workers, conveyance system, potential to impact treatment efficiency and operations, and potential of the final effluent to impact biosolids and receiving water quality. The program uses its authority to enforce regulations, where applicable, including issuing fines to facilities that fail to meet compliance standards established by the program. The goal of the enforcement plan is to bring facilities into compliance with regulations as soon as practicable.

KCIW is also one of the regulatory agencies that coordinates the investigation and control of sources of pollutants in the LDW.

## **Sediment Management Program**

WTD carries out a SMP to remediate contaminated sediments near CSO outfalls. The SMP addresses sediment contamination near CSOs identified on the state's Contaminated Site List. The SMP's objectives are to repair potential environmental damage through a timely, efficient, and economical process; to prevent harm to public health; and to limit future liability. Sites in the LDW either have been addressed under the Elliot Bay Duwamish Restoration Program or are being addressed through the County's participation in the LDWG and SCWG under the LDW Superfund cleanup. The County's efforts included past and ongoing source control work to identify and control the sources of pollution that may pose health or environmental problems if they accumulate in sediments and to prevent recontamination of cleanup areas in the LDW.

- The County and City of Seattle conducted a series of source control efforts in the Norfolk and Duwamish/Diagonal basins prior to sediment cleanups to reduce the potential for recontamination. Nearfield modeling estimated which chemicals have the potential to recontaminate the sediment, and source control efforts were targeted on those chemicals. These efforts included a broad investigation to try to identify phthalate sources in both basins, including product testing and atmospheric deposition testing, and a specific source identification of a historical phthalate spill in the Duwamish/Diagonal basin.
- The County and City of Seattle developed a joint program to inspect every business in the Duwamish/Diagonal basin prior to the Duwamish/Diagonal early action cleanup. The joint program identified on-site problems related to discharges to sewers or storm drains, site activities and BMPs, materials storage, and waste handling and disposal. Problems were handed to the appropriate regulatory programs to resolve. Follow-up inspections several years later identified the need for periodic inspections to address new source issues resulting from business or staff turnover. This basin-wide study became the

approach that has been applied throughout the LDW drainage basin. Ongoing efforts are coordinated through the SCWG.

- Following source control efforts, over 6,200 linear feet of the Diagonal SD and several main tributaries were cleaned to prevent material in the lines from recontaminating the Duwamish/Diagonal sediment cleanup. Even with the cleaning, ongoing releases of phthalates were predicted to accumulate near the outfall at levels above state standards.
- The Sediment Phthalate Work Group was formed by the County, Cities of Seattle and Tacoma, Ecology, and EPA to address phthalate recontamination. The group was tasked with trying to determine the source of phthalates, the risks they represent, and the potential to control them, and to make recommendations to address the regulatory conundrum they create for recontamination of cleanup sites. This work led to the understanding of the problems faced with controlling chemicals that are transported through the air-water-sediment pathway, including bis-2-ethylhexyl phthalate (BEHP), PCBs, dioxin/furans, and PAHs.

Further characterization of the combined system in the LDW through whole water sampling of discharges, in-line sediment traps, and in-line solids grab samples is used to identify potential sources in the CSO basins. Elevated contaminants are then traced back to their sources, where possible, and the information is shared with the appropriate regulatory agency for follow-up. Once ongoing sources have been controlled, WTD staff carries out line cleaning to remove historical contamination in sediments that could be mobilized during high flows. Together, these actions represent the ongoing source control efforts in the combined system that will continue on an as-needed basis during the 2014–2018 period.

To address gaps in knowledge of sources entering the system and the LDW, the County started several ongoing studies that will further target and refine source control efforts into the future. Studies that will continue and be completed in the 2014–2018 period include the following:

- **CSO basin input study.** Information is lacking on apportionment between the contributions from domestic wastewater, infiltration (groundwater), and stormwater runoff to combined sewers in CSO basins. Understanding this breakdown can help target future source tracing and control efforts in combined basins. This study involves collecting flow-proportioned samples of wastewater from both the Brandon and South Michigan CSO basins to evaluate these three sources of CSO inputs to the LDW. This work is scheduled to be complete in 2015.
- **Atmospheric deposition study.** In 2005 to 2007 King County focused atmospheric studies on phthalates in the LDW basin, but data was also collected for PAHs and PCBs.<sup>3</sup> A renewed atmospheric deposition study was initiated in 2011 and provides important information for evaluating the atmospheric deposition pathway in the LDW for metals, mercury, PAHs, PCBs, and dioxins/furans.<sup>4</sup> Five stations representing various land uses located in the Lower Duwamish Valley and the Green River watershed were sampled for bulk atmospheric deposition (wet and dry deposition) from July 2011 through October

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<sup>3</sup> In most cases, PCBs and most PAHs were not detected with the less sensitive analytical methods available at the time.

<sup>4</sup> Analysis of newer atmospheric deposition data uses more sensitive analytical methods than the earlier King County studies.

2012. Two stations were located in the urban areas of the LDW: Duwamish and South Park stations. The Duwamish station represents an industrial area and the South Park station represents a mix of industrial/commercial and residential land uses. Of the remaining stations, one station was in an urban residential neighborhood (Beacon Hill), one station was located in a suburban/commercial area (Kent), and one station was located in the rural area of Enumclaw (Mud Mountain).<sup>5</sup> The data report was completed in December 2013. Additional atmospheric disposition sampling was conducted in 2013 to fill a spatial gap in Georgetown and to collect supplementary data for PCBs and dioxins/furans in the Lower Duwamish Valley. The report documenting the 2013 sampling is scheduled to be complete in 2014.

- **Green River watershed studies.** The County is conducting three studies in the Green River watershed: whole water, stream sediments, and stream suspended solids. The results of all three studies will assist in understanding upstream sources to the LDW. They will provide a better understanding of apportionment of contaminants being transported downstream, the use of different types of measurements, and distribution of potential sources, and will help target future sampling and source control efforts in the watershed.
  - **Whole water study.** The whole water study will make relative comparisons of PCBs, arsenic, and PAHs in the Green River and its major tributaries. This study includes collection and analysis of surface water samples from four major tributaries to the Green River (Newaukum, Soos, and Mill creeks and the Black River) and at two locations on the Green River main stem: an upstream location at Flaming Geyser State Park (upriver of the major tributaries being sampled) and a downstream location in Tukwila at Foster Links Golf Course (downstream of the tributaries). At each of the six locations, composite samples were collected during the dry season to represent baseflow conditions (September 2011) and during storm events (between October 2011 and October 2012). The data report will be completed in March 2014. In 2013 and 2014, additional water samples were collected from locations further upstream in the Green River above most rural development (at Kanaskat-Palmer State Park) and above the Howard Hanson Dam, where salmon migration is blocked, to assess potential contributions from these two sources. This work was completed in March 2014.
  - **Stream sediments study.** An assessment of sediment quality in the Green River Watershed was conducted to characterize chemical concentrations and to better understand the relative differences in sediment quality in the watershed. Stream basins sampled included Mill Creek in Auburn, Mill Creek in Kent, Jenkins Creek, and Covington Creek in 2012, and Soos, Newaukum, and Springbrook creeks in 2008-2010. Stream basin sampling sites were placed approximately every creek mile, where possible. Green River main stem locations were sampled in 2012 and included an upstream location at Flaming Geyser State Park (upriver of the major tributaries being sampled), a downstream location at Foster Links

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<sup>5</sup>A sixth station was added in the Kent area toward the end of the study for paired comparison with the original Kent station; microscale effects were suspected in Kent after interim review of the dioxin/furan data.

Golf Course (downstream of the tributaries), and just upstream of Soos Creek and Mill Creek in Kent. A total of 58 samples were collected and analyzed for metals, mercury, PCBs, PAHs, and other organic compounds, including dioxin/furans in a subset of samples. The data report was completed in February 2014.

- **Suspended Solids Study.** The suspended solids study will make relative comparisons of PCBs, arsenic, dioxins/furans, and PAHs associated with suspended solids in the Green River and its major tributaries. This study is also intended to provide a measure of initial estimates of inputs to the LDW from the Green River and from major tributaries. The same six locations are being sampled in the Green River and tributaries as in the whole water study described above. The study will use two types of collection methods. One method (sediment trap) will collect suspended solids over a two to three month period and the other method (using a filter bag) will collect suspended solids during storm events and during one baseflow event. Sampling will occur during 2013–2014, and a data report will be completed in 2015.
- **Combined basin stormwater inspections.** This effort looks at the relative significance of stormwater sources by systematically canvassing the properties in the Brandon and South Michigan basins to evaluate the magnitude of stormwater issues in combined basins. Together with the CSO basin input study, the work will refine the understanding of the relative significance of these sources. The inspections are conducted by an Ecology inspector funded by King County. This work is scheduled to be complete in 2015.
- **Nearfield discharge modeling.** This ongoing effort has developed a nearfield model that can predict sediment deposition around a CSO discharge. Sediment samples to characterize chemical concentrations near outfalls have been collected at several CSOs, including in the LDW, to refine and validate the model. The calibrated model will be used to evaluate recontamination potential following cleanup and help identify COCs for recontamination to target ongoing and future source control efforts. Work is scheduled to be complete in 2015.

### **Ongoing Flow Monitoring and Facilities Inspection/Maintenance Programs**

An important component of ensuring water and sediment quality protection throughout WTD's service area is the ongoing monitoring, inspection, and maintenance of WTD's facilities to ensure they are operating properly.

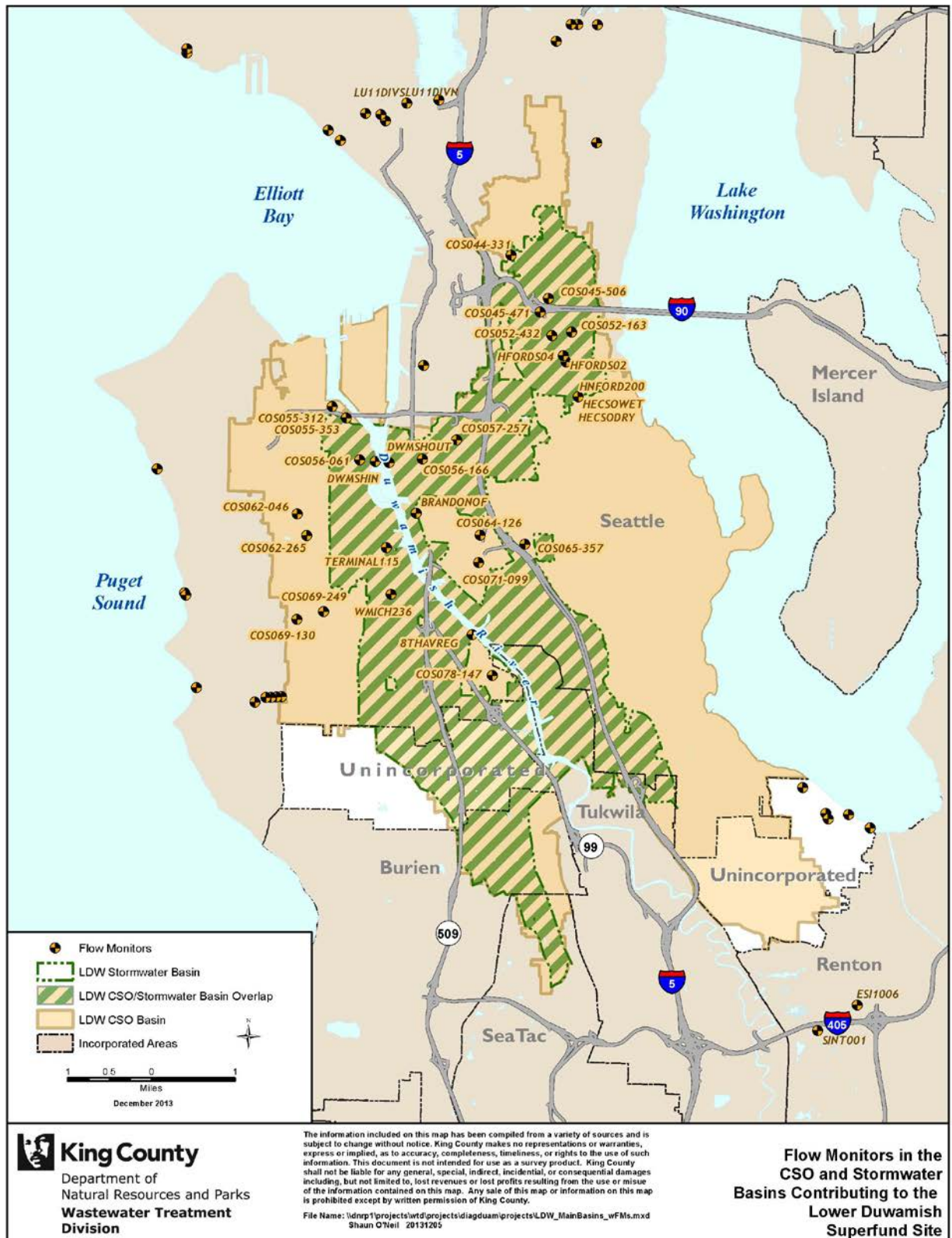
WTD's Flow Monitoring Program monitors approximately 30 locations in LDW combined sewer basins. Flow monitoring is conducted using portable area-velocity flow meters. Data from these locations are used for fulfilling permit overflow reporting requirements, calibrating CSO basin models, planning and designing CSO control projects, and optimizing system operations to minimize overflows. Flow is monitored on both a short-term basis (one to two years duration) and a long-term basis (more than two-year duration) depending on project-specific and regulatory requirements. Figure B-3 shows the current location of flow meters in the LDW source area.

WTD's Facilities Inspection Program inspects sewer lines on a seven-year cycle so that each sewer line is inspected at least once every seven years. CSO outfall pipes are inspected about every five years.

In addition, a rock box located on the West Duwamish Interceptor is cleaned once a year. The rock box is located at an overflow structure, just before the interceptor siphons under the Duwamish River. The rock box is a 10-yard sump in the line that allows for settling of solids in the wastewater before it goes through the siphon in order to keep the siphon from clogging and causing overflows to the LDW.

If any issues are found resulting from any of the investigations, such as cleaning or repair needs, actions are taken as appropriate.

More information on WTD's Flow-Monitoring and Facilities Inspection programs is available at: <http://www.kingcounty.gov/environment/wtd/Construction/Assets.aspx> and <http://www.kingcounty.gov/environment/wastewater/CSI/FlowMonitoring.aspx>.



**Figure B-3. Portable Flow Meters in King County's Combined Sewer System in the Lower Duwamish Waterway**



## Educational and Public Outreach Activities

WTD offers educational information as part of its source control activities. The following activities that are likely to continue over the next five years include the following:

- **Informational websites.** WTD provides several websites for people to access information on how to protect the LDW. Examples include websites on how to safely dispose of materials people do not want or no longer need; on Lower Duwamish cleanup efforts and associated public meetings; “Our Duwamish” website that provides source control educational information and links to organizations that are involved in the LDW source control area; and on controlling fats, oil, and grease from being discharged to the sewer system.
- **Community outreach.** WTD reaches out to communities in the LDW source control area to engage them in LDW cleanup efforts, CSO control planning efforts and project design, Green Grants program, RainWise program, and other WTD capital projects in the area. In addition, WTD staffs informational tables at farmer’s markets in the LDW, at Boeing employee events, and local summer street fairs; conducts interviews and briefings with community leaders; and participates in community meetings sponsored by other organizations. CSO informational materials are available in English, Vietnamese, and Spanish to increase the opportunity for communities to learn about the projects.
- WTD staff also provides information on river tours sponsored by the Duwamish River Cleanup Coalition and informational tables at public meetings on the Superfund cleanup.
- **Wastewater education and tours program.** WTD treatment plant tours, open houses, and education programs provide information on the history of the need for sanitation and clean water, treatment processes, resource recovery programs, pollution prevention for homes and businesses, and Puget Sound and LDW health. In 2013, the education and tours program reached over 13,000 participants, including 7,100 fourth to seventh graders. More than 2,500 community members, including university and professional groups, toured WTD’s treatment plants.
- **Annual participation and sponsorship of the Duwamish River Festival.** The festival offers opportunities for the public to learn more about the continuing efforts to restore the Duwamish River.
- **KCIW educational programs and workshops.** The KCIW program provides a newsletter and biannual workshops to update industrial dischargers of regulations and procedures, and posts links on its website with helpful information about local, regional, state, and federal resources they can access to better manage their pretreatment systems. Fact sheets are also produced to provide more specific information on how the program implements its regulations. Compliance awards serve as an incentive for industrial facilities to strive to meet and to maintain compliance with environmental regulations. In addition, a specific poster on the do’s and don’ts to protect the LDW are provided during inspection visits (Figure B-4), and businesses are sent a letter following each inspection with helpful tips on what they can do to improve their practices.

WTD also funds the LHWMP, which in addition to outreach and education activities, focuses on product substitution and legislation to control chemicals at their product source; information on the program is provided later in this chapter.

More information on WTD's educational and outreach activities is available at:  
<http://www.kingcounty.gov/environment/wtd/Education.aspx>.

## Protecting the Duwamish Waterway is good business. You can help keep the Waterway clean.

<div style="text-align: center; font-weight: bold; font-size: 1.2em;">Do</div> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>Do store chemicals and other materials under cover with secondary containment.</b></p> </div> </div> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>Do keep outdoor areas well maintained.</b></p> </div> </div> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>Do make sure onsite grease traps and oil/water separators are regularly maintained so they work well.</b></p> </div> </div> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>Do clean up spills. Maintain a spill plan and train employees to use it.</b></p> </div> </div> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>Do regularly maintain onsite drainage facilities.</b></p> </div> </div>	<div style="text-align: center; font-weight: bold; font-size: 1.2em;">Don't</div> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>Don't store chemicals and materials outside near drains that can pollute stormwater.</b></p> </div> </div> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>Don't allow debris, dirt, leaks and spills in outdoor areas to reach drains or sewers.</b></p> </div> </div> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>Don't allow grease and oil to bypass onsite treatment systems. Grease can clog the sanitary sewer system and create backup problems. Oil and other pollutants that reach the storm drain system are bad for the environment.</b></p> </div> </div> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>Don't allow spills to reach storm drains.</b></p> </div> </div> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>Don't allow buildup of material in onsite drainage facilities.</b></p> </div> </div>
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**Contacts:**  
**Ask what's OK to discharge into interior drains:** Contact the King County Industrial Waste Program by calling 206-263-3000 or TTY Relay: 711, or e-mail: [info.KCWI@kingcounty.gov](mailto:info.KCWI@kingcounty.gov), or go to: [www.kingcounty.gov/industrialwaste](http://www.kingcounty.gov/industrialwaste).  
**Get help identifying and disposing of hazardous wastes:** Businesses are liable for cleanup costs. Contact the Business Waste Line by calling 206-263-8899 or e-mail: [businesswasteline@kingcounty.gov](mailto:businesswasteline@kingcounty.gov) or go to: [www.HazwasteHelp.org](http://www.HazwasteHelp.org).  
**Learn more about stormwater pollution control:** Contact Seattle Public Utilities by calling 206-684-7587 or go to: [www.seattle.gov/util/ForBusinesses/DrainageSewerBusinesses/index.htm](http://www.seattle.gov/util/ForBusinesses/DrainageSewerBusinesses/index.htm).  
**For free pollution spill kits for Seattle businesses,** with funding provided by Seattle Public Utilities, contact Resource Venture: 206-343-8505, or the Environmental Coalition of South Seattle (ECOSS) at: 206-767-0432.

Por formatos alternativos llame al 206-263-3018 o TTY relay: 711.  
Alternate Formats available. Voice: 206-263-3018 or TTY relay: 711.  
Dưới những dạng khác. Giọng Nói: 206-263-3018 hoặc TTY thu âm: 711.  
提供替代性语言格式。 声音: 206-263-3018或TTY中转: 711.

**A healthy Waterway  
depends on all of us  
working together to prevent  
future contamination.  
You can help by using these  
Best Management  
Practices (BMPs) to keep  
pollution out of stormwater  
and the sanitary sewer.**



Seattle  
Public  
Utilities



King County  
Department of Natural Resources and Parks  
Wastewater Treatment Division

Produced by King County IT, GIS, Visual Comm & Web Group 1303\_3177\_BMPposteraps\_skrau

**Figure B-4. Source Control Education Poster for Businesses**

## **RainWise Program**

WTD is working closely with SPU to offer the RainWise Program in selected portions of the WTD wastewater service area, including the LDW. Property owners who live in a targeted CSO basin in the LDW may be eligible for rebates to hire a trained RainWise contractor to install a rain garden or cistern. The program has met success in helping control stormwater runoff and CSOs. The County plans to offer this program through 2016.

Information on the RainWise Program is available at:

<http://www.kingcounty.gov/environment/wastewater/CSO/BeRainwise.aspx>.

## **Lower Duwamish Waterway Green Grants Program**

From 2011 through 2015, WTD has grant funding available for air or water quality improvement projects, environmental education, and community outreach efforts in the Duwamish River Valley. These grants are to help improve air and water quality in the Duwamish watershed, support the successful implementation of future CSO control projects in this area, and meet regulatory obligations for clean air. They are also offered to promote partnerships in the LDW with the goals of advancing source control for the LDW Superfund cleanup, developing local expertise in water and air quality protection, and enhancing small-scale environmental and economic opportunities in the community. Examples of projects include the following:

- Air quality improvements to sources of air pollution or projects that help solve air pollution
- Identifying sources of air pollution in the area
- Educating citizens and businesses about air pollution and ways to reduce exposure to air pollution
- Outreach to local businesses and community to promote air or water quality goals
- Stormwater bioretention/biofiltration projects (such as rain gardens, bioswales, and filter strips)
- Stormwater controls and practices that prevent contaminated stormwater from entering the river

WTD is expanding this program, as noted in Chapter 3.

## **Water and Land Resources Division**

WLRD helps protect the County's water and lands so that its residents can enjoy them safely today and for generations to come. WLRD provides diverse services, such as water quality studies and analyses, river and floodplain management, watershed basin stewardship, rural and agricultural services, and implementation of and compliance with the County's Phase I Municipal Stormwater NPDES permit.

WLRD's SWMP includes a number of programs that address pollutant prevention and reduction in stormwater discharges to the LDW and other receiving waters in King County. These actions

and their associated agencies can be found in the 2013 SWMP document.<sup>6</sup> WLRD also coordinates the actions of other King County agencies that have responsibilities under the Municipal Stormwater NPDES permit. Implementation of the permit includes code enforcement; mapping; agency coordination; development and redevelopment requirements; construction, inspection, and maintenance of stormwater management facilities and conveyance systems; source control; spill response; illicit connection detection and removal; property management; operation and maintenance of the MS4; and public education and outreach. These programs are in unincorporated areas of the county. The nexus for some of the programs with the LDW is small, and some programs are implemented by other agencies, as described in this chapter.

The programs WLRD primarily implements and that have most relevance to the LDW are the Source Control, Facility Inspection, IC/IDDE, and MS4 Mapping programs in unincorporated areas.

- The Source Control Program provides technical assistance, education, and code compliance activities to business and property owners. The goal of these activities is to reduce and eliminate existing or potential pollutant discharges to the MS4 and surface waters in unincorporated King County, a small portion of which are in the LDW drainage basin (see Figure 3-3).
- The Facility Inspection Program ensures that stormwater flow control and water quality treatment facilities are properly functioning and appropriately maintained.
- The IC/IDDE Program addresses potential sources of stormwater pollution by conducting investigations, inspections, and follow-up actions to ensure compliance with King County's Water Quality Code; identifying illicit connections and discharges; and removing them.
- WLRD is responsible for mapping and documenting the MS4 in the County's jurisdiction, on the properties it owns or operates, and on properties that are discharging to the County's MS4.

These stormwater management programs and WLRD's public education and outreach program are described further in this section. In addition, WLRD is responsible for some of the actions described in Chapter 3.

More information on WLRD's programs is available at:  
<http://www.kingcounty.gov/environment/wlr.aspx>.

### **Source Control Inspection Program**

Source control inspections are conducted on commercial, industrial, and multifamily sites. The inspections focus on providing technical assistance to business and property owners in the implementation of source control BMPs for pollutant-generating activities. Any problems or shortfalls that are identified during a site inspection are followed up with corrective actions letters. Follow-up inspections are conducted to ensure compliance has been met. For difficult or larger issues, water quality engineers work with the business or property owner until the

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<sup>6</sup> The SWMP is available at: <http://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/stormwater-management-program/2013-swmp-and-appendices.pdf>.

problems are corrected and a compliance letter is issued. Code enforcement actions are taken where needed. Whenever reasonable, inspections are conducted jointly with Ecology for those businesses that have either general or individual NPDES permits. The same applies for businesses that are located in King County but drain to the City of Seattle.

### **Stormwater Facility Inspections Program**

Facility inspections of publically and privately owned and maintained stormwater flow control and water quality treatment facilities are conducted annually unless records allow a less frequent inspection schedule. The inspections ensure that stormwater facilities are properly maintained and operated. Custodial agencies that own stormwater facilities are issued Maintenance Orders and owners of private facilities are issued Maintenance Correction Letters, if necessary. If any water quality problems are found, or there appears to be inadequate use of BMPs, the site is referred to the Source Control Inspection Program to correct the problems.

### **Water Quality Complaint/Illicit Discharge Detection and Elimination and Spill Response Programs**

County programs are in place to address illicit connections and discharges and other water quality requests and complaints. Reports are received in a number of ways, including RSD's 24-hour hotline, WLRD's Stormwater Services Section (SWS) Drainage and Water Quality hotline, Illegal Dumping Task Force hotline or website, other regional jurisdictions, state agencies, and discoveries by County staff.

### **Water Quality Complaint Investigations**

Water quality complaints are investigated within three days so that immediate or ongoing water pollution problems can be controlled or eliminated. Complaints and concerns are received by phone, through the online complaint form, or are referred from Ecology's Emergency Referral and Tracking System (ERTS). Initial review determines if the incident is located in the County or in another jurisdiction and if other agencies should be involved, such as Public Health. If it is a recurring problem or under some other investigation or enforcement, follow-up is conducted and enforcement action is coordinated with the appropriate agencies.

When the County receives reports of dumped or spilled materials outside of its jurisdiction, the appropriate agency or municipality is notified of the situation. Investigators then coordinate with other agencies or internal staff as needed to resolve the problem. Resolution includes determining whether there is a problem (or the result of natural phenomena such as iron oxide discoloration), tracing the source of the problem and eliminating it, stopping the discharge, providing education on proper disposal options or BMPs, assisting with cleanup, and referring the site for a full source control inspection.

### **Illegal Dumping**

Custodial agencies respond in several ways to illegally dumped materials or spilled materials on their properties such as the road ROW, parks, pumps stations, and park-and-rides. Illegally dumped solid waste is usually removed by the custodial agency, thus preventing potential illicit discharges. Dumped material suspected of being hazardous waste (such as methamphetamine laboratory waste), large-scale spills, unidentifiable dumped materials, or other potentially dangerous conditions require responses from either a spill response contractor, Ecology's Northwest Regional Office (NWRO) Spill Response Unit, or other appropriate parties.

## **Illicit Connections, Illicit Discharges Detection and Elimination, and Spills**

Any illicit connections, discharges, or spills discovered during maintenance or as a result of investigations or inspections of the stormwater system are reported to SWS, an investigation request is completed, and the relevant information is entered into the SWS complaint tracker database. The investigation request is assigned to a drainage investigator for an initial investigation, and, if necessary, to a water quality engineer who ensures that the connection is removed or plugged. BMPs are implemented to eliminate the discharge, or the source of the spill is found and cleanup occurs.

Spills or illicit discharges to receiving waters or to the MS4 are reported to the state and other appropriate agencies or jurisdictions, and investigated by the County. Spills or discharges of a material or size requiring a response beyond the County's capacity to respond are addressed by a spill response contractor, Ecology's NWRO Spill Response Unit, or other appropriate parties.

## **Public Education and Outreach**

King County implements public outreach and education programs, many of which are through programs in County departments and divisions, and through partnerships with LHWMP, regional salmon recovery groups, grant exchange program, and the King Conservation District. Some programs are focused on topics related to stormwater but include other critical missions, such as stewardship, soil conservation, wastewater, and habitat restoration or protection. Other programs focus on stormwater impacts and behavior changes that alter these impacts (yard care, animal waste, car washing, low impact development practices, vehicle oil leaks, etc.).

Public education and outreach programs are regional in nature or focused on particular target audiences including the general public; business owners; homeowners, landscapers, and property managers; engineers, contractors, and developers; and livestock owners. These programs include videos, on-site assistance, classes, written materials, technical standards, events, and websites.

King County facilitated the formation of a regional outreach consortium—Stormwater Outreach for Regional Municipalities (STORM). Over 80 municipalities throughout the region saw the advantage of combining their resources to create a strategy and campaign for outreach that would transcend jurisdictional boundaries. King County serves on the Steering, Campaign, and Measurement committees. STORM will coordinate its efforts with the Salmon Conservation Plan implementation, occurring at the Water Resources Inventory Area (WRIA) level, and with the Puget Sound Partnership.

More detail on the public education and outreach programs associated with King County's SWMP is available at: <http://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/stormwater-management-program/2013-swmp-and-appendices.pdf>.

## **Solid Waste Division**

King County's SWD provides garbage transfer, disposal, and recycling services for residents and businesses in all of King County, except for Seattle and Milton which includes the southern portion of the LDW drainage basin. SWD also provides household hazardous waste disposal options and recycling education programs. SWD's service area has a population of about 1.28 million, or about 70 percent of King County's total population as a whole. SWD's customers live in both incorporated and unincorporated areas of the county with the exception of the City of Seattle. Customers dispose of more than 800,000 tons of solid waste each year.

SWD is responsible for the County's Brownfields Program, which provides technical and financial assistance to qualified private individuals and businesses, nonprofit organizations, and municipalities in King County to assess and clean up contaminated sites, called brownfields. SWD's Brownfields Program is funded with grants from EPA to conduct ESAs on properties with confirmed or suspected contamination. Over the last 15 years, the program has conducted 11 Phase I and 22 Phase II ESAs resulting in a number of successful cleanup and redevelopment projects; some projects have been in the LDW drainage basin. Contaminates addressed include petroleum, PCE, PCBs, PAHs, and metals.

Formal Phase I and Phase II ESAs are conducted on behalf of government and non-profit entities; however, private businesses may also receive free technical assistance in brownfields assessment and cleanup planning. A Phase I ESA is a preliminary investigation into a site's history to determine if any activity or actions occurred on the site that could have contaminated the soil or groundwater. If such activities or actions are identified, they are called recognized environmental conditions (RECs). If the Phase I ESA has identified RECs, a Phase II is conducted to determine whether the RECs have created a contamination issue. The Phase II ESA generally focuses on taking samples of soil and groundwater to be tested in the laboratory for suspected pollutants. If contamination is confirmed, the Phase II ESA provides data that can be used to design a cleanup action plan (CAP) and prepare an estimate of cleanup cost.

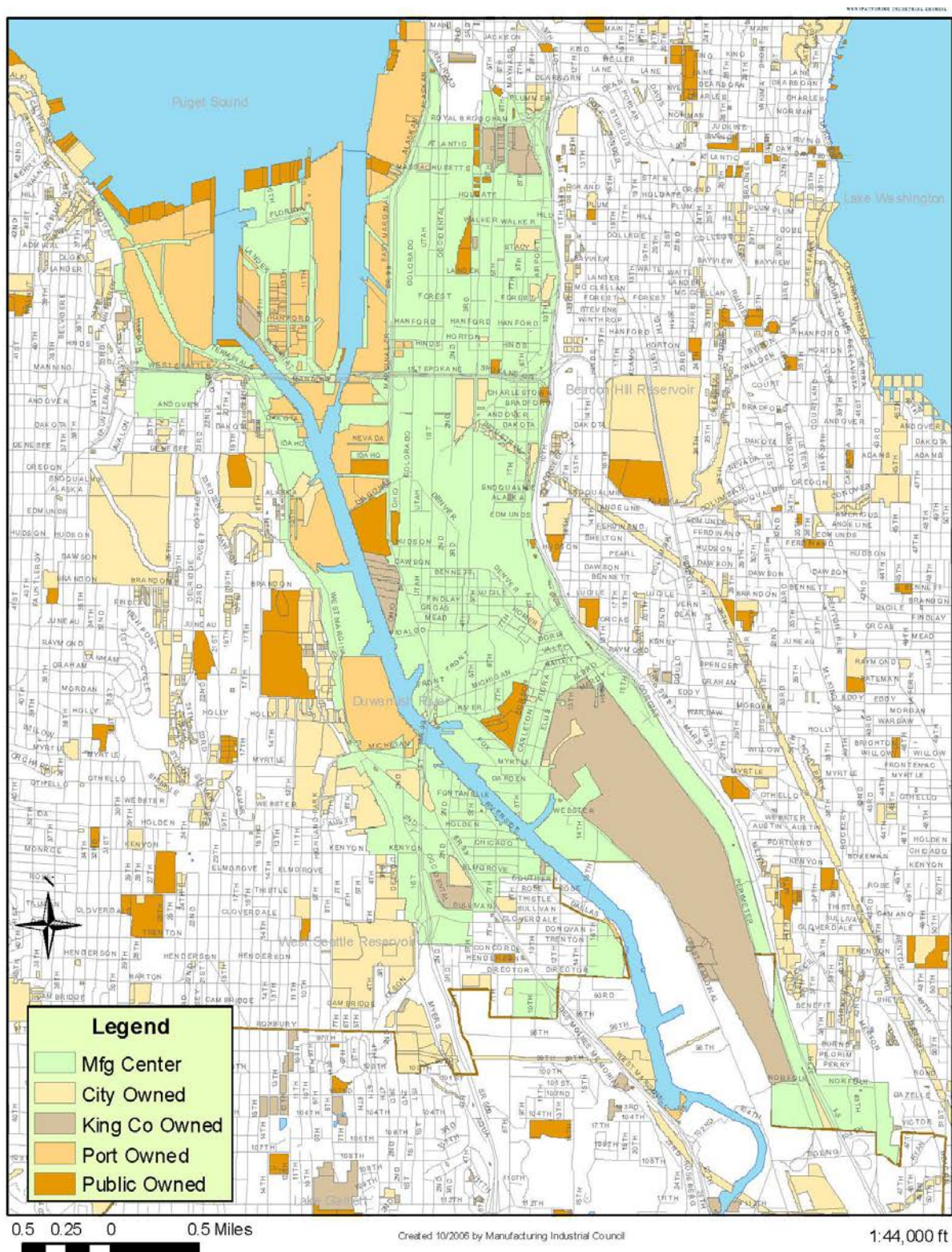
SWD does not have enforceable mechanisms for source control in the LDW; however, its Brownfields Program supports remediation and source control efforts in the LDW. Through 2013, the program conducted assessments on sites located in the Duwamish area, including a former gas station in Georgetown purchased by an artist's collaborative for a community art project. In addition, the program has facilitated several EPA Targeted Brownfields Assessments in the LDW drainage basin, including assessments on a former industrial cleaning plant, a metals foundry, and a former electroplating facility. Contaminants were reduced at all three sites.

Future activities for the current EPA brownfields grant will focus on assessing sites in the Duwamish manufacturing/industrial center and its surrounding residential neighborhoods (Figure B-5). The grant period is fiscal years 2013–2016. As a result, these efforts support source control by promoting cleanup of contaminated sites, thereby reducing the risk of contaminant migration to the Duwamish River.

SWD's Brownfields Program will conduct public outreach and education to members of the Duwamish community, including partners identified in the EPA grant application. These include the Duwamish River Cleanup Coalition, Environmental Coalition of South Seattle (ECOSS), Manufacturing Industrial Council of Seattle, SoDo Business Association, South Park Neighborhood Association, South Park Retail Merchants Association, TRAC Associates, and YWCA Seattle-King-Snohomish. SWD will also post and distribute fact sheets of assessment projects in a variety of public venues, including the Brownfields Program website.

More information on SWD's Brownfields Program is available at:  
<http://your.kingcounty.gov/solidwaste/brownfields/index.asp>.







## **King County International Airport**

KCIA, also known as Boeing Field, is one of the busiest primary non-hub airports in the nation. Located just five miles south of downtown Seattle, it averages more than 200,000 operations (takeoffs and landings) each year. The airport's economic impact is \$3.2 billion in terms of local business sales, supporting 12,618 jobs, and creating \$804 million in labor income in the County. The airport's 150 tenant businesses also directly support 4,900 jobs in the local economy.

The airport serves small commercial passenger airlines, cargo carriers, private aircraft owners, helicopters, corporate jets, and military and other aircraft. It is also home to Boeing's 737 aircraft flight-test program and other Boeing operations.

KCIA's primary pathway to the LDW is stormwater. KCIA has been in compliance with stormwater regulations related to Ecology's NPDES permits, which include industrial, municipal, and CSGPs. KCIA complies with Ecology's regulations under the toxics cleanup, UST, and dangerous waste programs. KCIA intends to continue its source control programs and services, or their equivalents, in the next five years and in the future within the limits of the County's obligations, priorities, and budget constraints. The activities are described in this section. KCIA is also responsible for one of the actions described in Chapter 3 (see Table 3-3).

More information on KCIA's programs is available at:  
<http://www.kingcounty.gov/transportation/kcdot/Airport.aspx>.

### **Enforceable Mechanisms for Source Control**

#### **Industrial Stormwater General Permit**

Ecology issued an ISGP for KCIA that covers industrial activities involving airport transportation (Chapter 90.48 RCW, Federal Clean Water Act). The KCIA ISGP coverage includes all the areas inside the KCIA property boundary. The ISGP includes the following requirements:

- Developing a facility Stormwater Pollution Prevention Plan (SWPPP) to document and mitigate pollutant generating sources
- Implementing source control through operational, structural, and treatment BMPs
- Conducting monthly stormwater discharge sampling, analyses, and review; additional sampling events are performed as needed to trace sources of pollutants
- Performing monthly facility inspections to review airport and tenant BMPs
- Performing corrective actions, as needed
- Reporting quarterly discharge monitoring results to Ecology
- Providing annual reports to Ecology to present findings of benchmark exceedances source control activities, and corrective actions
- Providing SWPPP training for staff

Ecology also has issued ISGPs for seven KCIA tenants. All other tenants operating at KCIA are covered under the KCIA ISGP and must comply with its specific requirements. New tenants with applicable industrial activities will be required to be covered under a separate ISGP. These

permits have five-year terms and are extended, accordingly, in five-year terms, as applicable industrial activities continue.

#### **Municipal Stormwater General Permit**

As a custodial agency and county property, KCIA adheres to the County's Phase I MSGP (Chapter 90.48 RCW, Federal Clean Water Act). The permit regulates the discharges from MS4s owned or operated by King County. WLRD is the lead agency managing permit compliance for the County. Regulatory requirements and associated actions pertaining to the permit include the following:

- **Mapping.** KCIA has provided, and continues to provide, updated KCIA stormwater drainage maps to WLRD.
- **Development standards.** KCIA and tenants control the quality and quantity of stormwater runoff in accordance with KCC and development standards, including the King County Surface Water Design Manual. The mechanisms include, but are not limited to, commercial site development permits, building permits, grading permits, and demolition permits.
- **Structural stormwater controls.** KCIA has installed, and will maintain, various stormwater facilities in accordance with KCC.
- **Source control assessments.** KCIA performs annual tenant assessments to ensure tenants are in compliance with requirements of the permit. Pollutant generating activities and BMPs are reviewed and updated each year. Tenants are also informed on spill response and de-icing policy updates. Tenants and operators at KCIA are required to comply with federal, state, and local environmental laws in accordance with their lease agreements.
- **Illicit Connection/Illicit Discharge Detection and Elimination.** KCIA performs annual IC/IDDE inspections at its discharge points to the LDW. The inspections include recording stormwater discharge conditions and collecting turbidity, pH, and temperature data. Source tracing, identification, and control will be performed as needed. To date, no illicit connections have been observed.

KCIA's Spill Response Policy gives requirements and procedures for tenants and operators during spill response events. The policy includes notification requirements and spill prevention, spill response, and reporting and procedures.

- **Operation and maintenance.** KCIA periodically cleans up stormwater facilities and catch basins, if inspection and sampling results indicate a need.

Mechanical sweeping of airport pavement occurs daily. This source control activity also adheres to the Federal Aviation Administration's (FAA) Foreign Object Debris (FOD) requirements.

- **Property maintenance.** KCIA performs annual inspections of sediment accumulation at stormwater facilities, including vaults, oil-water separators, infiltration systems, and StormFilter systems, and maintains the facilities as necessary. KCIA inspects oil-water separators weekly to remove floatables and petroleum hydrocarbons. KCIA tenants are required under lease agreement to perform maintenance.

The MSGP covers all areas inside the KCIA property boundary. KCIA and other custodial agencies attend quarterly meetings with WLRD to discuss the status of compliance, stormwater management plan updates, annual reports, permit issues, and other related items. MSGP permits have five-year terms and are extended, accordingly, in five-year terms.

#### **Construction Stormwater General Permit**

Development and construction at KCIA are performed in accordance with KCC Chapter 9.04, Surface Water Runoff Policy. For construction projects greater than one acre, KCIA and its tenants are also required to apply for coverage under Ecology's CSGP (Chapter 90.48 RCW, Federal Clean Water Act). The permit requires the following:

- Developing a construction SWPPP
- Implementing temporary erosion and sediment control BMPs
- Conducting monthly stormwater sampling
- Notifying Ecology
- Performing monthly construction site inspections
- Performing corrective actions, as needed
- Reporting monthly discharge monitoring results to Ecology
- Providing SWPPP training for staff

The CSGP requirements are limited to the construction area/boundary and through construction completion. The County's DPER also conducts inspections for building, commercial site development, demolition, and grading permits.

#### **North Boeing Field/Georgetown Steam Plant Site Model Toxic Control Act Agreed Order**

In accordance with the MTCA, Ecology signed Agreed Order DE 5685 with Boeing, KCIA, and the City of Seattle to facilitate remedial action at the North Boeing Field/Georgetown Steam Plant Site. Boeing, KCIA and the City are PLPs to the site. Under the Agreed Order, which became effective August 14, 2008, Ecology will conduct an RI/FS and interim actions, as needed.

The RI/FS is intended to identify contamination sources to sediments of Slip 4 of the LDW and clean up upland areas affected by site contaminants. The RI/FS work plan is presently in development. The RI is expected to be completed by February 2015 and the FS by January 2016. Remedial actions will be performed in accordance with the preferred and approved alternatives. Periodic technical meetings are held to inform Ecology on status, issues, and next steps.

#### **Cleanup of Contaminated Sites**

As part of redevelopment activities, KCIA performs site investigations, feasibility studies, and site cleanups in accordance with Ecology's Toxic Cleanup Program and MTCA requirements (Chapter 70.105D RCW, Chapter 173-340 Washington Administrative Code (WAC)). There are currently three KCIA independent cleanup projects in various stages of investigations for eventual cleanup. KCIA notifies Ecology of contaminant release, investigation status, and planned remediation activities.

Tenant site investigations are also under way, and are being performed in accordance with MTCA or EPA Superfund requirements.

#### **Management of Underground Storage Tanks**

KCIA ensures tenant UST compliance under Ecology's UST Program (Chapter 173-360 WAC). Under UST program regulations, tenant/operators must perform UST system notifications, inspections, monitoring, and reporting. Tenants who own and operate fueling stations and tanks at KCIA will continue to comply with UST requirements in the next five years and beyond as operation continues. KCIA keeps and annually reviews UST records. KCIA coordinates with the County's Department of Transportation (DOT) to document aboveground and belowground storage tanks owned and operated by the County.

#### **Dangerous Waste Disposal and Reporting**

KCIA, as a waste generator, complies with Ecology's Dangerous Waste Regulations (Chapter 173-303 WAC) and RCRA to ensure hazardous wastes are properly disposed of and recorded. KCIA is required to submit a Dangerous Waste Report to Ecology each year for its waste streams. Tenants and operators are also required to comply with these requirements.

#### **Hazardous Materials Abatement**

For demolition of building structures at KCIA, hazardous material surveys are performed in accordance with the following:

- EPA 40 Code of Federal Regulations (CFR), Part 763
- Washington State Department of Labor and Industries (L&I) WAC 296-62-077, WAC 296-155-176, WAC 296-800-170, Chapter 296-841 WAC
- PSCAA Regulation III, Article 4

The surveys identify hazardous materials that require abatement and proper disposal prior to demolition. Asbestos-related activities are coordinated with DPER and with PSCAA.

#### **Airport De-icing and Washing Policy and Facilities**

To maximize stormwater protection, KCIA constructed de-icing and washing pads for aircraft. De-icing/wash pads were constructed to include oil-water separators before discharge to the sanitary sewer system. An aircraft de-icing and washing policy was established to ensure that tenants and operators are knowledgeable of approved de-icing locations and procedural requirements. KCIA also manages and maintains a KCIW Discharge Authorization (4109) to allow for de-icing/washing discharges into the sanitary sewer system.

#### **Capital Improvement Program**

Through its capital improvement program, KCIA has updated its infrastructure to support source control and remediation. These include rehabilitating runways and taxiways, refurbishing stormwater pump stations, repairing/replacing damaged stormwater pipes, and updating aging ground vehicles. In addition, the program allows for redevelopment activities such as environmental investigations, hazardous materials abatement, building demolition, feasibility studies, and environmental cleanups.

## Public Outreach and Education

KCIA participates in outreach activities intended for educating tenants and operators to control discharges of pollutants into the KCIA stormwater system. Some of these activities include the following:

- **Spill response training.** Spill response training is performed annually by Airport Operations to inform tenants of notification, response, and spill prevention requirements.
- **De-icing policy training.** De-icing policy training is performed annually during the fall to inform tenants on approved deicing procedures and locations.
- ***Inhabit* environmental newsletter.** *Inhabit* is a website that informs readers on environmental accomplishments at the airport including green roofs, sound insulation, and stormwater protection.

KCIA tenants are also reminded of the airport's ongoing compliance with environmental regulations during annual tenant assessments.

## Roads Services Division

King County's RSD designs, builds, operates, and maintains roads, bridges, and other features in the ROW in unincorporated areas of King County including part of the LDW drainage basin. The RSD service area includes about 1,500 miles of roadway and 180 bridges. RSD also has some areas of responsibility regarding maintenance of the County's MS4 system per the County's Municipal Stormwater NPDES permit, including street sweeping and vactoring, repairing, and cleaning stormwater flow control and water quality treatment facilities, catch basins, and conveyance systems (pipes and ditches). These efforts help address sediments and associated contaminants, and petroleum hydrocarbons, PAHs, and metals.

RSD has faced significant funding challenges in recent years. If funding can be secured, the division will be responsible for the stormwater line cleaning action described in Chapter 3.

More information on RSD's programs is available at:

<http://www.kingcounty.gov/transportation/kcdot/Roads.aspx>.

## Regional Road Maintenance Endangered Species Act Program

King County implements the Regional Road Maintenance ESA Program Guidelines, which are designed to minimize the impacts of road maintenance activities on receiving water bodies in order to protect their biota. The program emphasizes training and education for all Traffic and Roads Maintenance staff to promote the selection and use of BMPs to protect receiving water bodies from pollutants.

The program focuses on sediments and associated contaminants, but also includes petroleum hydrocarbons, PAHs, and metals. It covers unincorporated King County and areas in participating cities.

## Snow and Ice Response Program

The snow and ice response program applies sand, salt, and anti-icer to roads in unincorporated King County during inclement weather to improve traction and safety for the motoring public. Improved traction reduces the likelihood and severity of vehicle accidents which, in turn, limits and minimizes spills of automotive fluids. Recovery of sand post-event through sweeping and

catch basin cleaning minimizes the amount of sediment that is transported downstream to receiving water bodies. The program covers unincorporated King County and the cities that contract with the RSD. It addresses sediments and associated contaminants as well as substances that could be spilled as a result of vehicle accidents.

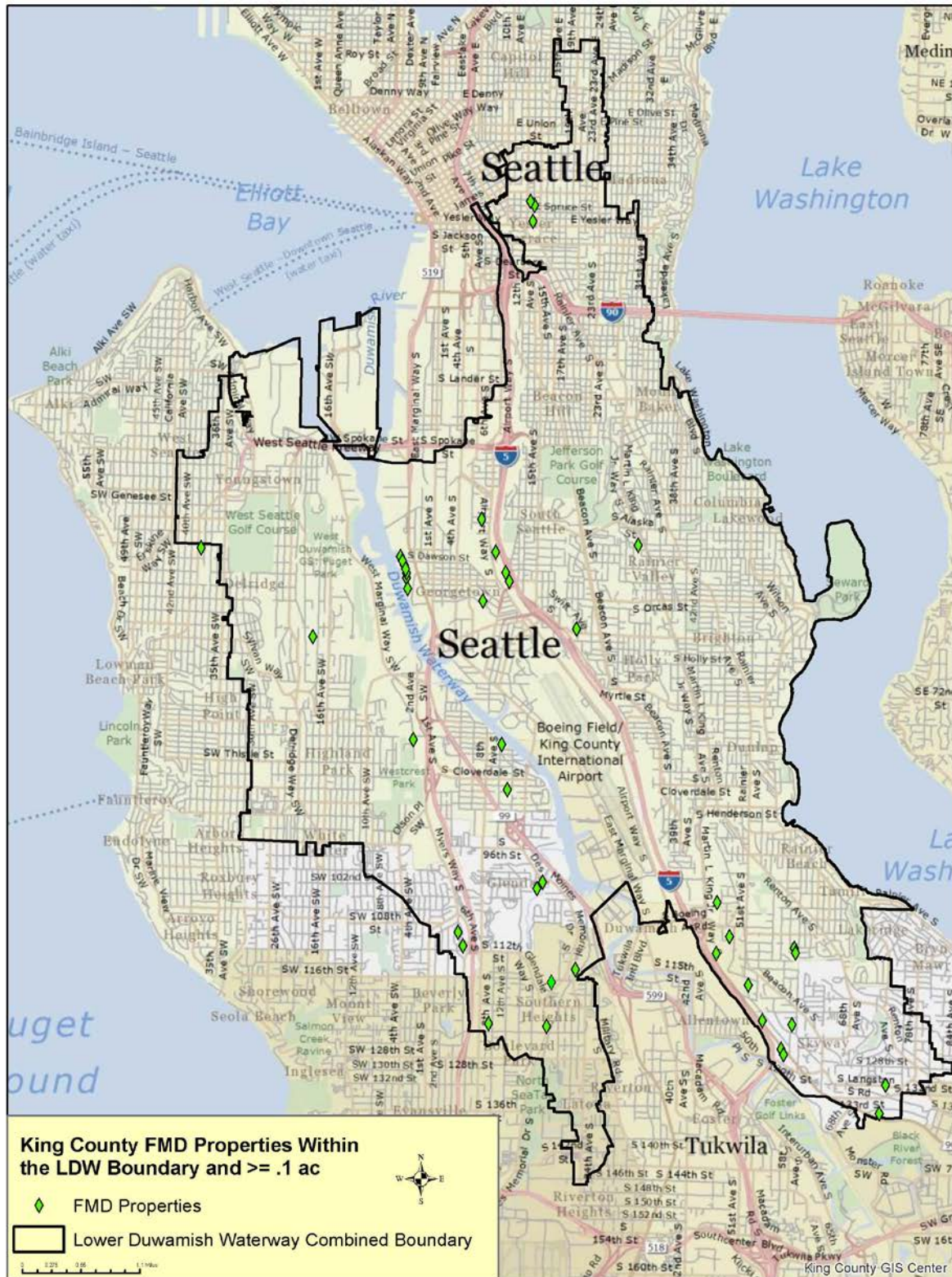
### **Routine Road Maintenance**

The Roads Maintenance Section maintains road ROW and associated stormwater conveyance systems throughout unincorporated King County. Maintenance is ongoing and covers a wide variety of activities designed to preserve the condition and functionality of infrastructure within the ROW. Activities include cleanup of automotive fluid spills, removal of illegally dumped solid waste, removal of landslide material, snow and ice response, stabilization of eroding soils, street sweeping, litter removal, shoulder grading, removal of creosote-treated timbers, and sediment removal from catch basins, pipes, ditches, and stormwater ponds. All of these activities can minimize delivery of pollutants to receiving water bodies. Pollutants addressed include sediments and associated contaminants, as well as substances potentially spilled as a result of vehicle accidents.

### **Facilities Management Division**

King County's FMD operates and manages the County's capital assets by developing and maintaining cost-conscious, sustainable, high-quality facilities and environments. FMD ensures that developed sites and vacant sites with stormwater facilities are inspected annually for stormwater and water quality compliance.

FMD is the custodial agent for seven parcels located directly on the Duwamish Waterway (referred to as the Harbor Bond properties), four developed parcels, and 137 vacant parcels scattered in the Lower Duwamish Superfund Source Area (Figure B-6). The Harbor Bond properties have been leased to a variety of tenants for almost a century for industrial and commercial purposes that benefitted from both rail and water access. A number of programs, permits, and activities are in place to reduce the potential of recontamination from the FMD properties in the LDW source area



**Figure B-6. King County Facilities Management Division Properties in the Lower Duwamish Waterway**



## Harbor Bond Properties

The Harbor Bond properties occupy the right bank of the Duwamish River from RM 1.0 to 1.2 (Figure B-7). These parcels include most of the underwater portion of Slip 1 and extend south to include the current operations of Manson Construction Company (Manson), Cadman Aggregate and Ready-Mix (Cadman), United Western Supply, J.A. Jack & Sons, Inc., and Verallia (formerly Saint-Gobain Containers). The business operations, stormwater management systems, and regulatory permits vary considerably:

- Manson leases the Slip 1 parcel and the ground and dock area to the south for storage and repair of marine construction vessels, equipment, and supplies. Stormwater from the ground lease area is captured and directed to an on-site infiltration system with no direct discharge to the Duwamish River. The company holds an industrial discharge permit for limited discharges to the sanitary sewer. Ecology has determined that Manson is not required to operate under an ISGP.
- Cadman imports, stores, and sells cement and aggregate, and also operates a large ready-mix batch plant. Stormwater is directed to an on-site cistern where it is stored for later use in the ready-mix product. Although there is a discharge pipe to the Duwamish Waterway, the company has not logged a discharge for several years. The cistern has been sized, according to company reports, for the 100-year storm event. The company operates under a Sand and Gravel General Permit administered by Ecology. It also holds an industrial waste discharge permit for limited discharges of process water to the sanitary sewer.
- United Western Supply operates a large warehouse and trans-shipment business. Most materials are stored indoors with very limited outdoor storage and off-loading from rail cars. One SD serves the property, which is mostly roofed, and discharges are not treated. Ecology does not require an ISGP.
- J.A. Jack & Sons, Inc, imports limestone spall and processes and sells industrial and agricultural limestone in bags and bulk. The facility treats and stores stormwater in a vault for infiltration and discharges excess stormwater from one outfall. J.A. Jack & Sons operates under a Sand and Gravel General Permit.
- Verallia operates a large facility along the LDW. Stormwater runoff from the county-owned property is restricted to large warehouse roof areas (one storm outfall) and paved areas for vehicular traffic (three separate outfalls). No stormwater exposed to industrial processes discharges from the property. The entire facility operates under an Ecology-administered ISGP.

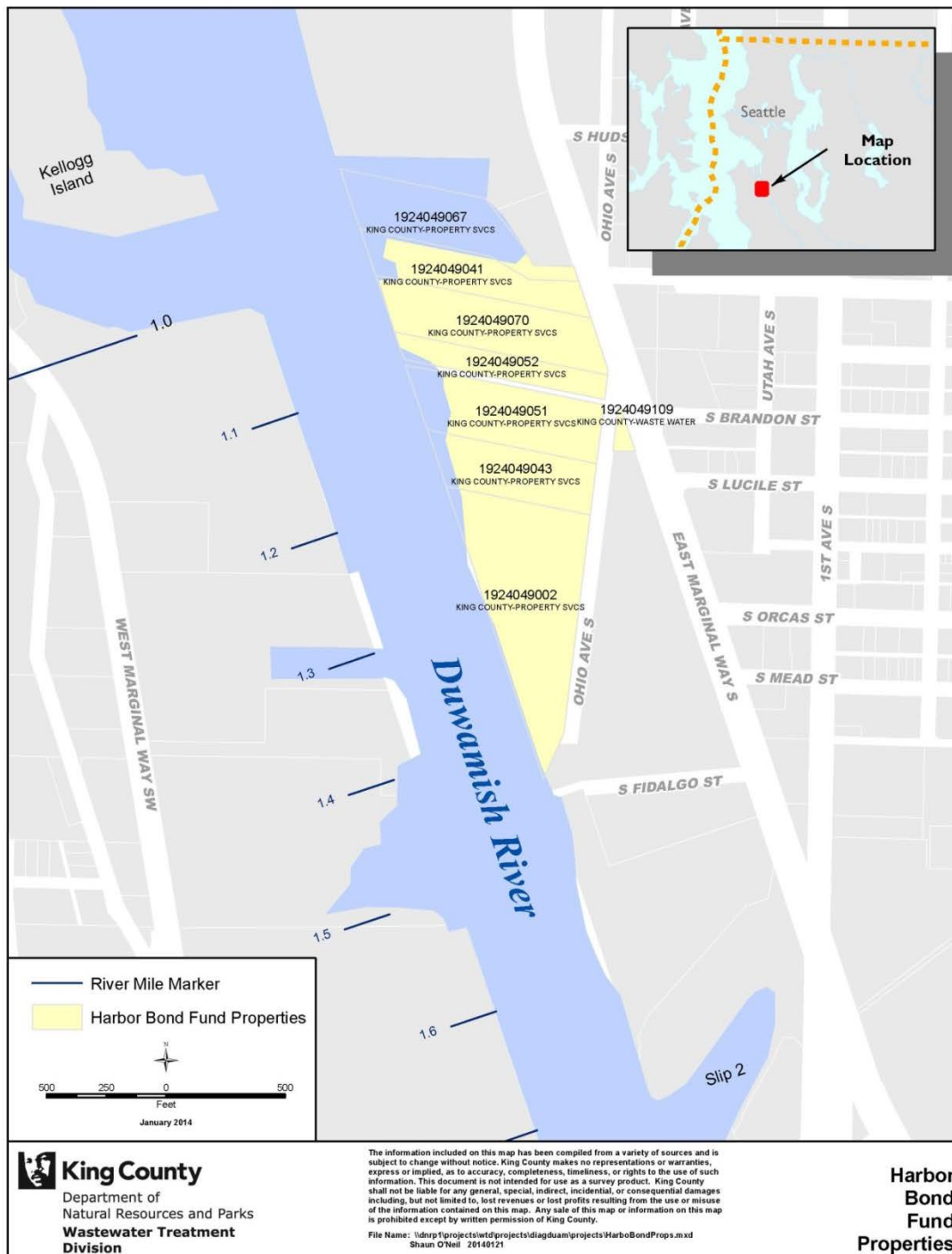
FMD contracts with WLRD to perform water quality compliance inspections at these Duwamish properties every five years in compliance with the County's Municipal NPDES Stormwater Permit. Inspections are coordinated with Ecology industrial permit inspections, Seattle stormwater compliance inspections, and, most recently, the Urban Waters Initiative inspection.<sup>7</sup>

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<sup>7</sup> The Urban Waters Initiative is an interagency coordination effort of Ecology that provides increased resources to speed up pollution reduction efforts to benefit the waters, the sediments, and human and marine inhabitants of the Duwamish Waterway.



These inspections ensure the stormwater collection systems are maintained and operated according to the approved designs and stormwater pollution prevention plans. Inspections also confirm that water quality BMPS are in place.



**Figure B-7. Harbor Bond Properties on the Lower Duwamish Waterway**

As custodial agent for King County, FMD administers leases with all these tenants and ensures the leases, as they are renewed, contain specific and comprehensive language requiring conformance with the most current applicable environmental regulations, including those for stormwater.

FMD will continue to coordinate and assist where possible to implement elements of the Ecology's January 2011 LDW Source Control Action Plan (RM 1.0 to 1.2). Recently completed actions called for in the plan include the following:

- Coordinated business inspections at the Cadman and J.A. Jack & Sons, Inc. facilities
- Confirmation of connectivity of a Manson catch basin to the Cadman system
- Source control inspection at United Western Supply

Remaining actions include participating in a visual bank survey at the Manson site with possible follow-up sampling and possible follow-up actions after Ecology conducts a confirmation analysis of the success of an earlier cleanup at the Manson site.

### **Other Properties**

The County manages four other developed parcels in the contributing area:

- The Orcas Street fleet maintenance facility contains paved parking for approximately 110 vehicles and a large warehouse structure enclosing all vehicle maintenance functions.
- The Barclay Dean facility on Seventh Avenue South houses county Sheriff's offices, indoor storage, and paved parking for about 20 vehicles.
- The Records and Elections Warehouse on East Fir Street includes three warehouse buildings and paved parking for about three dozen vehicles.
- The Youth Services Center (YSC) is a major facility on 12th Avenue South occupying more than four city blocks and includes courtrooms, offices, a major youth detention facility, and paved parking for more than 400 vehicles.

All these developed parcels are inspected annually under contract with WLRD for stormwater facility compliance, and every five years for water quality compliance. The County has funded a complete replacement of the YSC facility; Phase One will occur in the next five years. The design-build request for proposals indicates an intent to maximize application of Seattle's GSI techniques. These techniques will minimize stormwater runoff from the new facility that would otherwise discharge to the combined sewer system.

The remaining 137 properties are scattered throughout the rest of the contributing area and include a 19th century cemetery and small riverfront park. The remainder of the parcels are small, vacant properties that have come to the County through the failure to pay property taxes (Tax Title Properties) or as the result of open space dedications through formal platting processes. FMD is obligated by state law to retain custodial control over Tax Title Properties if they cannot be surplus through a defined process.

These properties have recently been folded into the stormwater inspection program conducted by WLRD. If constructed drainage facilities are discovered on the property, the parcel becomes part of the annual inspection and compliance program. If there are no drainage improvements, the parcel is inspected to determine if there are potential sources of water pollution (usually illegal

dumping of polluting wastes). The water quality inspection occurs on a five-year rotation. Discovered drainage deficiencies or polluting situations are corrected by Roads Maintenance crews or the Solid Waste Community Litter Program. The 105 parcels with an area of less than a tenth of an acre are managed on a complaint basis.

More information on FMD's programs is available at:  
<http://www.kingcounty.gov/operations/FacilitiesManagement.aspx>.

### **Environmental Health Services Division, Public Health – Seattle & King County**

The mission of Public Health is to identify and promote the conditions under which all people can live in healthy communities and can achieve optimum health. Public Health's Environmental Health Services Division supports efforts to control point sources that can potentially contribute to sediment contamination load in the LDW. This is accomplished through the following regulatory and oversight activities that are described in the following sections:

- Minimize potential human and environmental exposures to sewage and chemicals released from properties that have on-site sewage (septic) systems
- Administer and enforce state and local regulations governing the safe handling of solid waste; there are seven permitted solid waste facilities and 30 non-permitted solid waste facilities discharging into the LDW drainage basin
- Continue other regulatory activities related to the release of wastes from plumbing structures, food facilities, and water recreation facilities into public sewer systems
- Help prevent pollutants from entering the LDW through non-regulatory activities

More information on Public Health's programs is available at:  
<http://www.kingcounty.gov/healthservices/health.aspx>.

### **On-site Wastewater Program Regulatory Activities**

Public Health administers and enforces the "on-site" (on the property) sewage (septic) code put forth in Chapter 246-272A WAC and Chapter 13 of the King County Board of Health Code. These regulatory standards are intended to minimize human and environmental exposure to sewage from on-site sewage systems. There are several properties near the LDW known to have on-site sewage systems. Public Health evaluates and approves the design, location, size, age, functionality, installation, and maintenance contracts of on-site sewage systems for building permit applications on new systems (since 1999), remodels, and additions. Homes for sale (since 2009) must submit a current maintenance report performed by a Public Health-certified maintainer to Public Health and the buyer. Public Health assigns inspectors to investigate complaints of septic failure within two weeks of receipt. Property owners must repair their system or connect to public sewers. Failure to do so results in enforcement (i.e., notice of violation, notice and orders, civil penalties, and legal action).

The On-site Wastewater Program runs certification programs for all septic system pumpers, installers, and on-site system maintainers. The program provides outreach and "Sanitarian of the Day" phone support to property owners.

## Solid Waste Program Regulatory Activities

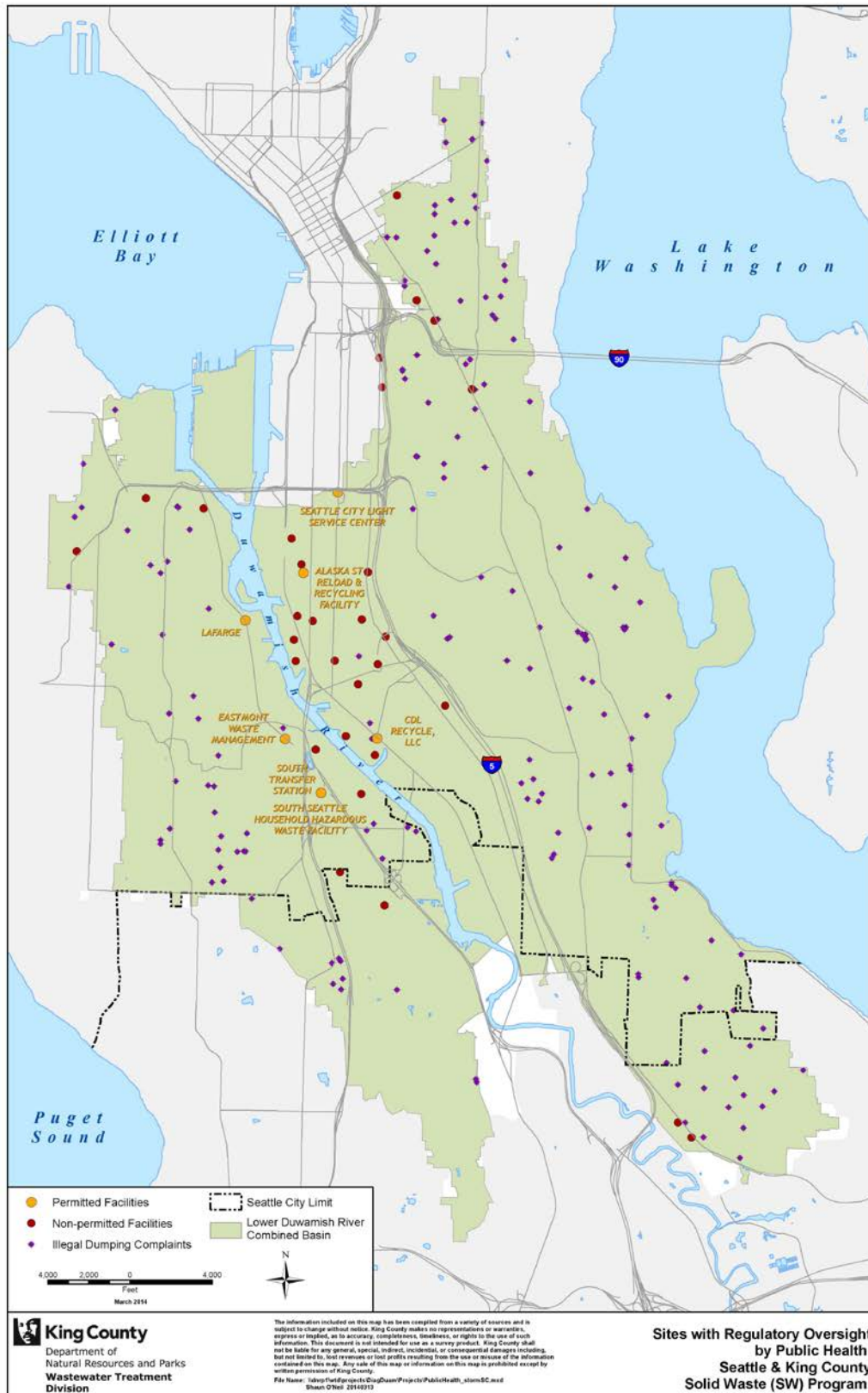
Under Chapter 173-350 WAC and King County Board of Health Code Title 10, the Solid Waste Program administers and enforces state and local regulations governing the safe handling of solid waste. Solid waste includes municipal solid waste (garbage); construction, demolition, and land clearing debris (CDL); compost materials; recycling materials; contaminated soils; medical waste; and moderate risk waste. Regulations minimize the potential for contaminants to leave the site by leaching into groundwater, runoff into stormwater, windblown dust, or vehicle track-out. Public Health follows up with enforcement as necessary and appropriate.

For the seven permitted solid waste facilities in the LDW drainage basin (Table B-2), Public Health reviews site schematics, evaluates operational plans, issues permits, monitors operations, and performs routine inspections (Figure B-8). Inspectors verify that solid waste handling activities and vehicle use are in compliance with regulations. Public Health recently received applications for three more proposed solid waste facilities in this watershed.

**Table B-2. Solid Waste Facilities in the LDW Drainage Basin Permitted by Public Health – Seattle & King County**

Name	Type of Facility	Site Address
Solid Waste Transfer Station (Seattle Public Utilities)	Municipal transfer station	8100 Second Avenue South Seattle, WA 98108
Eastmont Waste Management (Waste Management)	Recycling operation	7201 West Marginal Way SW Seattle, WA 98108
CDL Recycle, LLC	Construction, demolition, and land clearing debris processor	7201 East Marginal Way Seattle, WA 98108
Alaska Street Reload and Recycling	Solid waste piles that accept dredge materials and petroleum contaminated soils	70 South Alaska Street Seattle, WA 98134
Lafarge	Solid waste piles that accept dredge materials and petroleum contaminated soils	5400 West Marginal Way SW Seattle, WA 98106
South Seattle Household Hazardous Waste Facility	Moderate risk waste processing facility	8100 Second Avenue South Seattle, WA 98108
Seattle City Light South Service Center	Moderate risk waste processing facility	3613 Fourth Avenue South Seattle, WA 98134

Public Health reviews and assesses the waste handling practices of 30 permit-exempt solid waste facilities in the identified watershed discharging into the LDW (Figure B-8). Staff reviews annual reports and performs site visits at each facility to assess the types of solid waste present and waste-handling processes, and the measures used to prevent contaminants from adversely impacting the environment. Occasionally, Public Health will change a permit-exempted facility to a permitted facility and work with facility owners and operators on the regulatory requirements.



**Figure B-8. Sites with Regulatory Oversight by Public Health – Seattle & King County, Solid Waste Program**

Public Health responds to rodent complaints in Seattle, including areas near the LDW. Under King County Board of Health Code Chapter 8.06 (Rodent Control Regulations), staff performs site visits to identify rodent presence and educate residents on actions necessary to control rodents (for example, removing harborage areas and food sources). Public Health follows up on cases that are not corrected and enforces compliance as necessary and appropriate.

Public Health also responds to complaints of unlawful garbage dumping. Under Chapter 173-350 WAC and King County Board of Health Code Chapter 10.11, staff investigates complaints of dumping in partnership with King County cities. Figure B-8 shows the locations of complaints in the watershed discharging into the LDW drainage basin. Staff performs a site visit to assess conditions and to educate the owner of what is needed to comply with code. If no action is taken after a follow-up letter, Public Health enforces compliance as necessary and appropriate.

Public Health's Solid Waste Program maintains active websites with educational materials informing the public and businesses about solid waste disposal:

<http://www.kingcounty.gov/healthservices/health/ehs/toxic/SolidWaste.aspx>,

and rodent control: <http://www.kingcounty.gov/healthservices/health/ehs/rats.aspx>.

### **Other Public Health Regulatory Activities**

Other Public Health staff in the Environmental Health Services Division support source-control efforts in the area of the LDW through a variety of regulatory efforts and oversight activities, including enforcement of standards related to the release of wastes into public sewer systems. Examples include:

- Under the Washington State Environmental Policy Act (SEPA), Chapter 43.21C RCW, Chapter 197-11 WAC, King County Board of Health Code Section 2.06.10, and Seattle Municipal Code (SMC) Chapter 25.05, Public Health is authorized to review and comment on permit applications or agency projects and proposals.
- Public Health administers and enforces the Uniform Plumbing Code as adopted under KCC Chapter 16.32 and SMC Chapters 22.500–22.506, including standards for proper disposal of wastewater into a sanitary sewer. Inspectors will not approve building permits for structures that do not have a proper point of discharge. The program currently allows for collected rainwater to be used in non-potable applications (e.g., flushing toilets and urinals). These actions can result in reduced releases into the stormwater system.
- Under Chapters 246-215, 246-260, 246-262 WAC and King County Board of Health Code Chapters 2, 5, and 14, Public Health enforces state and local food safety regulations (Chapter 246-215 WAC and Chapter 5 Board of Health Code) and state and local water recreation facility (WRF) regulations (Chapters 246-260 and 246-262 WAC and Chapter 14 Board of Health Code), including standards governing the proper disposal of food and WRF wastewater into a sanitary sewer. The program works closely with food establishments to require proper management and disposal of food wastes, such as oils and grease.

### **Non-Regulatory Activities**

Through a Memorandum of Understanding between Public Health and DNRP, Public Health maintains a website with educational materials about potential health impacts from exposure to fecal matter from CSOs. In addition, Public Health runs a hotline to address general questions and complaints. In response to rare sewage discharges from CSOs in the LDW, Public Health

collects water samples at marine beaches downstream of the LDW. Other activities Public Health participates in are as follows:

- Provides guidance to SPU's IDDE team on the risk level associated with discharges and appropriate response.
- Participates on the PSCAA advisory council; staff provides counsel and input on agency programs and regulations.
- Provides outreach through its Dirt Alert Program to areas along the coastline of King County affected by the Tacoma Smelter Plume, including areas in the LDW. The educational materials on arsenic and lead helps prevent exposures in this area and supports the recruitment of homeowners in highly affected areas for free soil sampling.
- Collaborates with Washington State Department of Health (DOH) on outreach messaging for DOH fish advisories in King County, including the fish advisory for the LDW. Public Health is seeking funding to provide grants to community partners.

Public Health is one of the five agencies comprising the LHWMP. Public Health staff supports LHWMP to maintain educational outreach, inform the public about household hazardous chemicals, and work with businesses in vulnerable geographic areas to provide guidance for secondary containment to small quantity generators as an incentive and to prevent pollution.

### **Local Hazardous Waste Management Program**

King County's LHWMP is a multi-agency program focused on moderate risk waste in King County, including in all incorporated cities and unincorporated county areas. Participating agencies include the County's SWD and WLRD, Public Health –Seattle and King County, SPU and the Sound Cities Association. The program implements the moderate risk waste plan required by Chapter 70.105 RCW, as updated most recently in 2010 and approved by Ecology. It addresses hazardous wastes generated by residents and generated in small quantities by businesses and institutions.

Services include household hazardous waste collection; public education; small quantity generator technical assistance; small quantity generator waste collection; and targeted outreach, technical support, and financial incentives to communities and businesses. These efforts help keep pollutants out of surface waters, including the LDW, and the environment. The programs include the following:

- On-site technical assistance visits to small businesses and institutions
- Educational services to help reduce potential exposures and increase better waste practices
- Policy initiatives, such as product stewardship legislation addressing mercury-containing lamps, unused pharmaceuticals, paint, batteries, and other hazardous products
- Training of investigators in identification of sources of COCs
- Working with selected industries, including dry cleaners, nail salons, artists, and janitorial services, to address and explore options for shifting away from the wide variety of hazardous products used

Of particular importance to the LDW source control efforts are LHWMP's on-site technical assistance visits to small businesses and institutions. LHWMP investigators provide on-site consultation services throughout the County; in 2013, they were on-site at more than 500 locations, including many in the LDW. Over the past 22 years, LHWMP has assisted more than 35,000 businesses and institutions with direct eyes-on-site technical assistance visits.

LHWMP also works with selected industries and the various ethnic groups known to work in each industry. Currently, the program is focusing on dry-cleaning companies to explore options for shifting away from perchloroethylene (PERC) and other chlorinated solvent spot cleaners. The program is also working with artists to address the wide variety of hazardous products they use in glass work, pottery, printing, painting, jewelry, and various other trades. Nail salons are another focus, mainly addressing worker and customer exposures to hazardous solvent vapors. LHWMP is also targeting janitorial/custodial services, both in commercial and residential settings, focusing on safe use of cleaning products and promotion of safer alternative cleaners. Lastly, the program works closely with landscape service companies and their workers, promoting proper use of pesticides and pesticide-reduction techniques.

More information on LHWMP's services is available at: <http://www.lhwmp.org/home/>.



## Appendix C

### Schedule in Consent Decree to Complete King County's Long-Term Combined Sewer Overflow Control Plan Projects

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#### **APPENDIX B: CSO Control Measures, Design Criteria, Performance Criteria, and Critical Milestones**

CSO Control Project and Discharge Serial Number (DSN)	CSO Control Measure(s)	Description	Design Criteria	Performance Criteria in a Typical Year	Critical Milestones	Estimated Project Cost in 2010 Million Dollars
Hanford #1 (DSN 031)	Increased Conveyance and Storage Tank	Increased conveyance to the Bayview Tunnel and storage tank near Rainier Avenue	0.34 MG of peak CSO storage with conveyance <sup>2</sup>	Reduce to one overflow event per year on a 20-Year Moving Average	<ul style="list-style-type: none"> <li>• Submission of Facilities Plan by December 31, 2014</li> <li>• Completion of Bidding by December 31, 2016</li> <li>• Construction Completion by December 31, 2019</li> </ul>	\$19.2
Brandon St./S. Michigan St. (DSN 041/039)	CSO Treatment and Conveyance	High rate clarification treatment to control CSOs along the East Waterway	66 MGD of peak CSO treatment and new conveyance system	CSOs shall meet all NPDES Permit limits and State water quality standards	<ul style="list-style-type: none"> <li>• Submission of Facilities Plan by December 31, 2015</li> <li>• Completion of Bidding by December 31, 2017</li> <li>• Construction Completion by December 31, 2022</li> </ul>	\$139.7

<b>CSO Control Project and Discharge Serial Number (DSN)</b>	<b>CSO Control Measure(s)</b>	<b>Description</b>	<b>Design Criteria</b>	<b>Performance Criteria in a Typical Year</b>	<b>Critical Milestones</b>	<b>Estimated Project Cost in 2010 Million Dollars</b>
W. Michigan St./Terminal 115 (DSN 042/038)	Storage Pipe <sup>1</sup>	Storage pipe along West Marginal Way	0.32 MG of peak CSO storage <sup>2</sup>	Reduce to one overflow event per year on a 20-Year Moving Average	<ul style="list-style-type: none"> <li>• Submission of Facilities Plan by December 31, 2020</li> <li>• Completion of Bidding by December 31, 2022</li> <li>• Construction Completion by December 31, 2025</li> </ul>	\$14.8
Chelan Ave. (DSN 036)	Storage Tank	Storage tank near West Duwamish Waterway	3.85 MG of peak CSO storage on West Duwamish Waterway near Chelan Avenue	Reduce to one overflow event per year on a 20-Year Moving Average	<ul style="list-style-type: none"> <li>• Submission of Facilities Plan by December 31, 2018</li> <li>• Completion of Bidding by December 31, 2020</li> <li>• Construction Completion by December 31, 2023</li> </ul>	\$51.7

CSO Control Project and Discharge Serial Number (DSN)	CSO Control Measure(s)	Description	Design Criteria	Performance Criteria in a Typical Year	Critical Milestones	Estimated Project Cost in 2010 Million Dollars
Hanford #2/ Lander St./King St./Kingdome (DSN 032/030/028/0 29)	CSO Treatment	High rate clarification treatment facility in South Seattle neighborhood	151 MGD of peak CSO treatment and modifications to existing conveyance system	CSOs shall meet all NPDES Permit limits and State water quality standards	<ul style="list-style-type: none"> <li>• Submission of Facilities Plan by December 31, 2024</li> <li>• Completion of Bidding by December 31, 2026</li> <li>• Construction Completion by December 31, 2030</li> </ul>	\$270.8
3 <sup>rd</sup> Avenue West (DSN 008)	Joint City-County Storage Tank  OR  Independent County Storage Tank	Storage tank on north side of Ship Canal  OR  Storage tank near Seattle Pacific University (\$56.4 million)	7.23 MG of peak CSO storage  OR  4.18 MG of peak CSO storage	Reduce to one overflow event per year on a 20-Year Moving Average at one County site and multiple City sites	<ul style="list-style-type: none"> <li>• Submission of Facilities Plan by December 31, 2018</li> <li>• Completion of Bidding by December 31, 2020</li> <li>• Construction Completion by December 31, 2023</li> </ul>	\$50.3
University (DSN 015)	Joint City-County Storage Tank <sup>1</sup>  OR  Independent County Storage Tank <sup>1</sup>	Storage tank near University of Washington  OR  Storage tank near University of Washington (\$54.5 million)	5.23 MG of peak CSO storage  OR  2.94 MG of peak CSO storage	Reduce to one overflow event per year on a 20-Year Moving Average at one County site and multiple City sites	<ul style="list-style-type: none"> <li>• Submission of Facilities Plan by December 31, 2023</li> <li>• Completion of Bidding by December 31, 2025</li> <li>• Construction Completion by December 31, 2028</li> </ul>	\$45.2